JAN 13 1943

the OIL AND GAS JOURNAL

WE ARE PROUD that the same planning, designing and workmanship that have made Byron Jackson Pumps Leaders for more than 70 years, have been devoted since 1939 to producing ordnance for our Government -- resulting in the recent award of two Army-Navy E Flags "for high achievement in war production".

We appreciate the understanding attitude of our customers -- many of whom have been both friends and customers for a quarter century and more. Although war comes first, we are trying to meet your present needs while we all look forward to the peaceful days of the future.

BYRON JACKSON CO.

JANUARY 14, 1943

Made Right . . .
TO MEASURE RIGHT

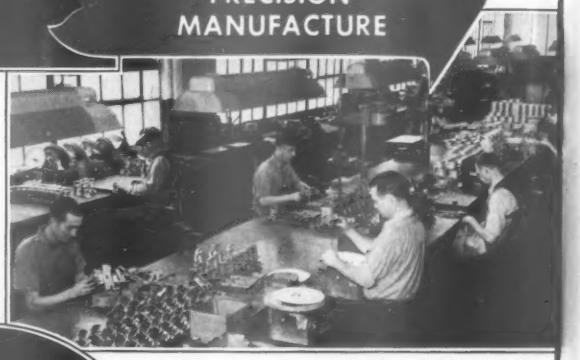
Sectional drawing showing exclusive Rotocycle principle of displacement measurement.

CORRECT DESIGN

Section of assembly floor devoted exclusively to the manufacture of Rotocycle Meters.

PITTSBURGH ROTOCYCLE METERS

PRECISION MANUFACTURE



Registers for Rotocycle Meters are assembled by skilled craftsm

RIGID INSPECTION AND TEST

Portion of test department where Rotocycle Meters are checked and calibrated.

Pittsburgh Rotocycle Meter, Model B-5, with Straight Reading Setback Register.

PERFECTION in design must be supported by perfection in manufacture. The task of producing a mechanical product, such as a meter, which meets the approval of both the designer and user oftentimes requires more ingenuity than the initial engineering work in designing. The proper factory methods, machines, tool accessories, inspection and testing procedure are all highly important steps in building a quality product.

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Production of Pittsburgh Rotocycle Meters is now at a new all-time high. Our factories and assembly lines are operating on a 24-hour basis to meet the urgent demands of Army, Navy, Air Corps and Defense Pipelines.

We are proud that a large share of our gasoline and oil meter production has been drafted for the essential requirements of the war effort.

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MERCO NORDSTROM VALVE COMPANY
Main Offices, Pittsburgh, Pa.

NATIONAL METER DIVISION, Brooklyn, N. Y.

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Empire Streamline Oscillating Piston for Bulk Plants

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Pittsburgh Reciprocating Piston for Tank Trucks, Bulk Plants

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THE WORLD'S LARGEST MANUFACTURER OF GASOLINE, OIL, AND GREASE METER

the OIL AND GAS JOURNAL

published weekly by the

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The Oil Bank of America

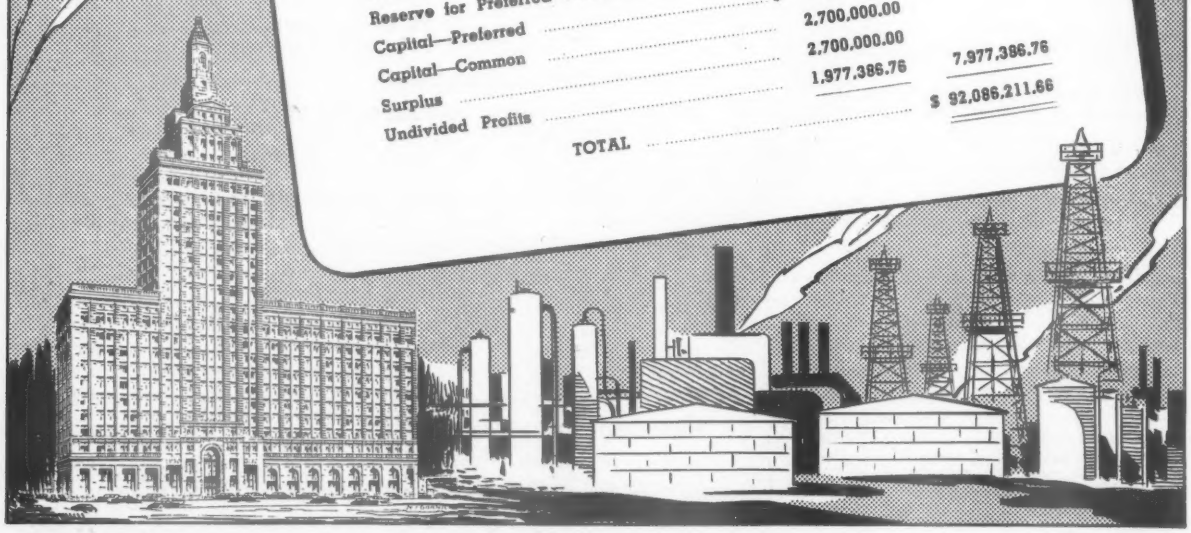
Statement of Condition December 31, 1942

RESOURCES

Cash and Due from Banks	$ 38,892,700.86	
U. S. Government Securities	27,270,394.56	
Other Bonds and Warrants	4,497,764.66	$ 70,660,860.08
Loans and Discounts		18,485,896.75
Overdrafts		3,211.44
Income Receivable Accrued		138,743.39
Stock in Federal Reserve Bank		180,000.00
Bank Premises		2,617,500.00
TOTAL		$ 92,086,211.66

LIABILITIES

Deposits		$ 83,971,765.44
Income Collected, Not Earned		52,381.93
Reserve for Taxes, Interest, etc.		75,677.53
Reserve for Preferred Dividends		9,000.00
Capital—Preferred	$ 600,000.00	
Capital—Common	2,700,000.00	
Surplus	2,700,000.00	
Undivided Profits	1,977,386.76	7,977,386.76
TOTAL		$ 92,086,211.66



NATIONAL BANK OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States — Page 70

CRUDE PRODUCTION 3,832,830 bbl. daily average—down 37,025 bbl. One year ago 4,252,460 bbl.

CRUDE STOCKS 233,938,000 bbl. as of Jan. 2 — up 711,000 bbl. One year ago 244,440,000 bbl.

GASOLINE STOCKS 84,245,000 bbl. as of Jan. 9—up 1,825,000 bbl. One year ago 95,705,000 bbl.

RESIDUAL FUEL-OIL STOCKS 72,559,000 bbl. as of Jan. 9—down 322,000 bbl. One year ago 94,700,000.

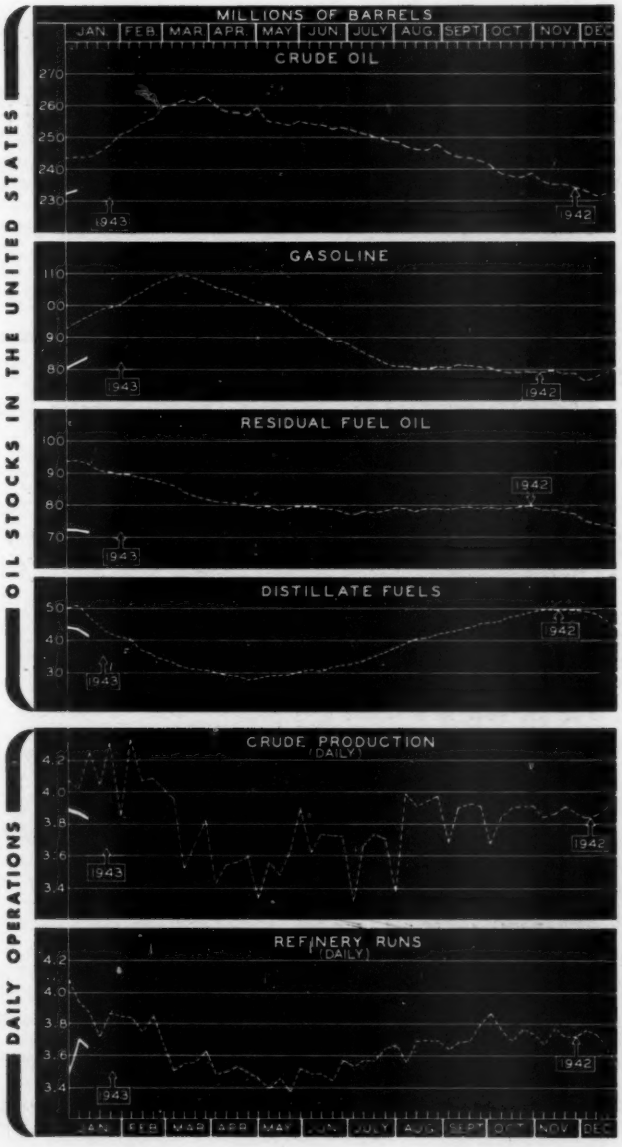
GAS OIL AND DISTILLATES 41,367,000 bbl. as of Jan. 9—down 1,546,000 bbl. One year ago 50,119,000.

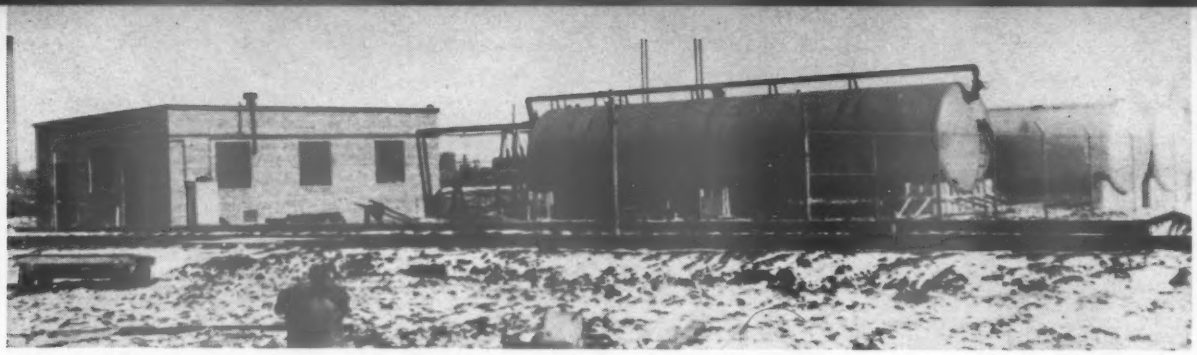
REFINERY RUNS— 3,674,000 bbl. daily week ended Jan. 9—down 60,000 bbl. One year ago 3,968,000.

WHILE the greater part of the latest report of the Committee on Petroleum Economics of the PIWC was devoted to matters having to do directly with the shortage in eastern oil supplies, the committee also stressed the plight of many refiners who are endeavoring to carry out the Government's directives involving important changes in their plant operations. The committee pointed to the necessity of compensating refiners for these changes and also coordinating the operations of all refiners in order to most efficiently serve the war program.

THERE is a feeling among many refiners that not only the war agencies but other branches in the oil industry do not fully appreciate the scope and importance of their difficulties. As an example they point to the latest directive in which interior plants are ordered to increase their yields of residual fuel oil 7 per cent above the average for the last half of 1941. Seven per cent amounts to 2.94 gal. per barrel of 42 gal. refined. In the Mid-Continent the application of this program in some cases means the substitution of a product bringing 6 cents per gallon for one bringing 2 cents per gallon, a loss of 4 cents or 11.74 cents on each barrel of crude oil refined. This is the maximum loss in refinery revenue. It is sufficient at some plants to represent the difference between profit and loss in over-all plant operations.

THIS is just one phase of the operating problems of refineries. Where products are shipped, the price paid for war products, unusual labor conditions, and shortages of crude-oil supplies are all factors. As indicated in the economics committee report the solution lies in the complete coordination of all refinery operations with particular reference to conditions in Districts 1, 2, and 3. In this program the needs of plants manufacturing war products such as aviation gasoline, toluene, and synthetic-rubber intermediates would receive first consideration. The remaining operations would be balanced against the needs of all classes of buyers, taking into consideration the plant location, properties of crude oil available and refinery processing equipment. Under this plan one plant might double its yields of distillate and fuel oil with a corresponding decrease in gasoline while only minor changes would be made in the peacetime operations of another plant. In general yields of heavy products would increase. Studies are being made under the direction of PAW.





A typical liquefied petroleum gas installation at a war plant with storage facilities for 75,000 gal. of propane

Liquefied Petroleum Gas Vital to War Production

by G. G. Oberfell

IN 1942 the liquefied petroleum gas industry enlisted for the duration. Normal expansion of business in the domestic field was halted by government order in January and by April all activities were brought under federal supervision and restricted to war and essential civilian projects. The abrupt halt in domestic-selling activity came as the first real retarding influence in an industry which had been growing at an average rate of well over 30 per cent per year in good times as well as bad.

Industrial demand was severely curtailed early in the year when normal peacetime-manufacturing operations were abandoned while many plants were being tooled for war production. As soon as conversions were completed the industry was called on for greatly increased deliveries. In the fourth quarter particularly, the completion of new war plants built since the attack on Pearl Harbor has increased demand for liquefied petroleum gases at a greatly accelerated pace.

For the year as a whole it is estimated that marketed production of liquefied gases totaled 548,000,000 gal., an increase of 19 per cent over 1941. This is the smallest percentage increase in demand since 1938. In 1941, the increase was 47.7 per cent, in 1940 the increase was 40.2 per cent. The convenience of liquefied gas for domestic use and the many advantages of this type of fuel for manufacturing operations has been so well sold by the industry that 1942 demand undoubtedly would have exceeded 600,000,000 gal. had it not been for the restrictions made necessary by the war.

It is estimated that 125,000 new domestic consumers of liquefied petroleum gases were added in 1942 despite the cessation of selling activity. A greater part of these were added early in the year before the industry was restricted. In 1941 there was an increase of 520,000 users. Some new installations have been made throughout the year at war-housing projects. Total number of domestic consumers at the end of the year is estimated at 1,825,000.

Chemical Demand Excluded

Table 1 gives details of liquefied petroleum gas demand by major types of use in 1942 compared with previous years. This tabulation does not show the volume of liquefied gases used in the production of aviation gasoline or synthetic rubber. Consumption at chemical plants, served by pipe line with hydrocarbons in a gaseous state, has not been included. An effort has been made to eliminate duplications where products have been resold to others.

Utilization of liquefied gas fractions at oil refineries for the production of aviation gasoline has increased rapidly during the past year. If these fractions were included in this report the total consumption would have shown an even greater increase than in recent years. An increasing volume of normal butane is moving to isomerization plants. Isobutane is being segregated wherever possible for alkylation with unsaturates to produce 100-octane aviation gasoline.

Propane supplies at refineries have been affected by the segregation of propylene for cumene manufacture. At many plants isomers and unsaturates are being moved from ordinary motor fuel and the volatility is being restored by the use of normal butane. Some propane has been blended with motor gasoline to increase volatility in emergencies when butane supplies were low.

As the national synthetic-rubber program which is based on the utilization of C_4 cuts gets into full swing in 1943, the liquefied petroleum gas industry is expected to continue its recent trend of placing more emphasis on propane. In 1942 propane consumption for normal L.P.G. uses increased much more rapidly than butane.

Oil refiners are using greater quantities of propane in lubricating-oil manufacture. Recently, it was stated that propane now is used to improve the quality of more than half of all lubricating oils produced. Volume used for this particular purpose is relatively small when compared with total propane production but in the aggregate such small uses have an important effect on total demand.

Shortages of other fuels have had a substantial effect on the demand in 1942. The tremendous increase in the demand for acetylene has created a

The author, vice president in charge of research for Phillips Petroleum Co., Bartlesville, Okla., has 30 years of technical experience and executive work in the natural gasoline and refining industries as qualifications for this outlook and review of the liquefied petroleum gas operations. He has been instrumental in building the Phillips company into one of the largest manufacturers of liquefied petroleum gases and natural gasoline in the world.

TABLE 1—Marketed Production of Liquefied Petroleum Gas

Year—	Total sales: 1,000's gallons per year	Total sales: Per cent increase over previous year	Distribution—thousands of gallons per year: Domestic	Per cent increase over previous year	Industrial and miscellaneous	Per cent increase over previous year	Gas manufacturing	Per cent increase over previous year
1922	223	...	Sale of liquefied petroleum gas confined primarily to bottled-gas business prior to 1928					
1923	277	24.4						
1924	376	36.0						
1925	404	7.2						
1926	465	15.2						
1927	1,091	134.6						
1928	4,523	314.6	2,600	...	400	...	1,500	...
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9
1933	39,931	14.1	16,626	2.3	13,987	71.3	8,318	—14.3
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	—24.3
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4
1936	106,652	38.8	30,014	40.4	67,267	40.5	9,371	23.6
1937	141,400	32.7	40,823	36.0	89,402	32.9	11,175	19.3
1938	165,201	16.7	57,832	41.7	94,983	6.2	12,386	9.8
1939	223,580	35.3	87,530	51.3	120,615	27.0	15,435	24.6
1940	313,456	40.2	134,018	53.1	159,153	32.0	20,285	31.4
1941	462,852	46.5	220,722	65.0	216,875	35.8	25,255	24.4
1942	555,000	20.1	265,000	20.0	262,400	21.0	27,600	9.3

shortage of that gas with the result that the use of propane for metal cutting has increased to a remarkable extent. More shipyards and other fabricators of steel sheets and plates have been using propane for cutting and saving acetylene exclusively for welding.

The manufacture of small-caliber ammunition, shell cases, and bombs ranging in size from the 250-lb. variety to the recently developed "block busters" has taken an increasing volume of liquefied petroleum gases. In the manufacture of small-caliber ammunition the fuel is used primarily for annealing of nonferrous metals. A separate annealing operation at 1,100° to 1,350° F. is required after each of a series of operations in forming the cases. The noncorrosive features of sulfur-free liquefied gases make them valuable in nonferrous-metal processing.

Work done on large-size shells is similar to that required on forgings. The bare stock is heated to 2,000° F. or higher before going to the presses. Manufacture of bombs depends on the size and type but in all cases carefully controlled heating operations are required and manufacturers have found that liquefied gases are highly desirable as fuel due to purity and ease of accurate control.

Economy Pronounced

Butane-propane mixtures are being used in mining machinery in the greatly enlarged operations of the nation's iron mines. At one mine, remarkable service records have been achieved. Trucks hauling 15 tons of ore per trip up 8 per cent grades have operated 9,000 hours without stops for maintenance. It was necessary to change lubricating oil only once every 1,000 hours on these units. An over-all increase in efficiency of 20 per cent has been achieved after conversion to liquefied gas fuels.

Army camps are large users of both propane and butane for cooking and water heating. One California camp not adjacent to natural-gas service uses 20,000 gal. daily. Hospital sterilizers designed originally for natural gas are using L.P.G. when installed at Army camps. Small war vessels of the corvette type use bottled gas for cooking.

Experimental work has been conducted in the use of liquefied gases to replace high-octane motor fuel in the testing and running in of high-compression aviation engines. The work was undertaken because the use of such gases would release substantial quantities of high-octane gasoline for actual flying operations, particularly in the pilot-training program. Work also has been done in the experimental use of such gases for cold-weather starting of airplane engines and partial use during the warm-up period. Since butane has an octane rating of about 90 and propane a rating of over 100 octane the fuels meet the most important characteristics required of an aviation fuel. Flight use is, of course, not being considered due to the container weight.

Prospective shortages of natural gas during peak-load periods in certain areas has created a large demand for standby installations since the declaration of war. Government agencies have urged some manufacturers of critical materials to install standby storage and gas-diluting equipment so that in case of natural or manu-

A 5,000-gal. transport used to deliver liquefied petroleum gas from oil refineries to war industries. Each such unit releases one or more high-pressure tank cars for long-haul service

factured-gas failure the plants will not be required to suspend operations.

From the standpoint of the liquefied petroleum gas industry the standby plants are a problem because prospective refills of storage will come during the winter months when the domestic-heating load and normal industrial consumption are at their peaks, particularly for butane-propane mixtures.

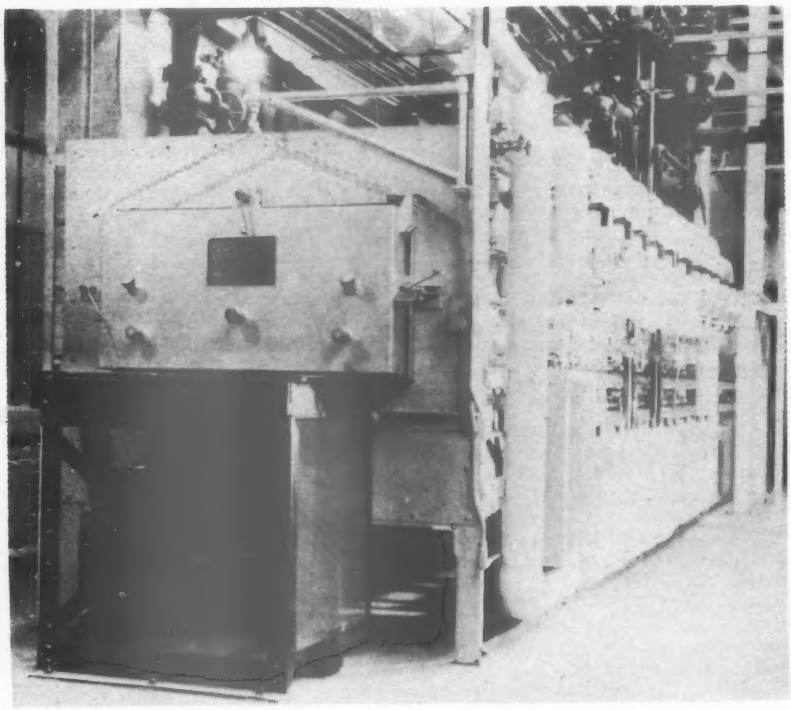
Transportation has been perhaps the most important single factor interfering with smooth operation of the industry during the past year. The lack of tankers for transportation of crude oil to the East Coast which created the gasoline and fuel-oil shortage likewise affected the eastern supply of liquefied gases. Normally most of the liquid gas consumed on the Atlantic seaboard is produced at East Coast oil refineries as a byproduct of gasoline-cracking processes. When eastern refineries were completed to reduce runs of crude oil, the liquefied-gas distributors were forced to haul products from western points. If tank cars were plentiful this would not be a serious matter as long as the railroads are functioning as efficiently as they are today. But there are no surplus cars in this high-pressure fleet.

From the standpoint of available transportation capacity, the industry's fleet actually decreased during the year. This is because of long hauls to the East and the large number of cars being used constantly for the transportation of isobutane and other alkylation and blending feed stock from gasoline plants to oil refineries. Toward the end of the year, the volume of material to be moved in pressure cars increased as the 100-octane and synthetic-rubber projects get under way.

Taking note of the critical winter transportation situation, the Government recently advised all users of liquefied petroleum gases to keep their storage tanks full.

Truck transportation has been effective in avoiding a crisis in liquefied gas transportation. The Office of Defense Transportation issued an order in June requiring all distributors to use trucks for the delivery of liquefied gases within a radius of 100 miles of the producing point. Later this trucking radius was extended to 200 miles. Only by obtaining special permission it is possible to use tank cars for hauls of less than 200 miles.

While it has not been possible to avoid asking for special permits on some shipments, the industry has made great progress in this direction One distributor has been able to eliminate 1,300 tank-car trips by the use of trucks. Assuming that a tank car will make 30 trips per year, this one distributor, in effect, added 40 tank cars to the nation's fleet by increased use of trucks.



Spark plugs for Army jeeps are fired in this kiln which utilizes liquefied petroleum gases as fuel. Large numbers of similar annealing ovens are employed in producing small-arms ammunition and "block buster" bombs

The industry burned a good deal of midnight oil during 1942 in the preparation of reports required by various government agencies. It has required a great deal of time and effort to comply with all of the government directives made necessary by the war. The industry got its first taste of operation under wartime conditions on January 14 when the War Production Board issued M-68-c, directing the industry not to make any new installations. In April this was followed by L-86, freezing all stocks of equipment and stopping all domestic sales activity except under special permit.

Although many elements of cost have arisen, the industry's prices have been frozen under OPA 88.

Office of Defense Transportation directives also have created special problems and built up paper work for the industry.

In the domestic distribution activities of the industry, a number of changes have been made in methods of operation to conserve rubber and relieve the manpower shortage. Some companies selling on a meter basis have begun billing customers every 2 months instead of every 30 days. With no merchandising activity it has been possible to divert manpower from selling to other work.

Total Supply Increased

Total supply of liquefied gases has increased during the year at gasoline and recycle plants built primarily to produce isomers for aviation gasoline. Oil refineries also have increased their output of some liquefied gases as a byproduct of the manufacture of unsaturates and isomers for aviation gasoline and synthetic rubber. Production of liquefied gases at oil refineries increased from 10 million gallons in January to more than 20 million gallons per month.

Much of the new production at natural-gasoline and recycle plants became available so late in the year that its effects will not be noted until next year. In Illinois, for example, two plants with a total daily production of 100,000 gal. of liquefied gases were brought on stream in the final quarter of the year. One did not start until late in December. Another Illinois plant is being remodeled to produce an additional 50,000 gal. of L.P.G. daily beginning about January 1. Illinois production of L.P.G. in 1943 may be nearly 50,000,000 gal. greater than in 1942.

Louisiana and Texas also increased production through the completion of new plants in 1942. A number of other plants will be ready for operation in the early part of 1943. In all instances new plants now being completed are equipped for the fractionation of isobutane and other special cuts needed for aviation gasoline and rubber. Construction of new plants is not permitted unless special war commodities are produced.

Acme

The ban on pleasure driving imposed last week throughout the eastern shortage area reduced traffic at Times Square, New York, once widely known as the crossroads of the world to what is shown in this picture. Photo was made at noon, looking north. Even the number of taxis, trucks, and buses has diminished

THIS WEEK

PRICES—Adjustment of product ceilings pledged, to compensate for higher yields of fuel, by OPA oil-price boss—but gasoline will be depressed. . . . ¶Aiming at continuation of present refinery revenue. . . . ¶Vertical lift of heavy-fuel prices, by 15 cents, advocated by PIWC . . . ¶Industry committees digging out additional data, for OPA, some action soon indicated. . . . ¶How much rise, where benefits will fall, still in doubt. . . .

DRILLING—Senator O'Mahoney goads RFC, PAW, WPB, to hasten government-financing program, for exploratory wells. . . . ¶Industry disinterested, fears subsidy would remove recognized incentive for efficiency. . . . ¶Forecast statements cling to program of 4,500 exploratory and 10,500 development wells, this year. . . .

TRANSPORTATION—Pipe lines now delivering 160,000 bbl. daily to East Coast. . . . ¶Tank-car movement surged up to 775,409 bbl. daily, for week ended January 2, increase of 74,582 bbl. . . . ¶WPB authorizes manufacture of 500 additional semitrailer tank trucks, making 800 total—all scheduled for delivery first quarter. . . . ¶PIWC proposes coastwise use of new tankers during break-in trials. . . .

REFINING—Total of 14 refinery-conversion projects included in butadiene program. . . . ¶Several proposals rejected. . . . ¶Delays in giving final approval, equipment deliveries give quick-butadiene program undeserved black eye. . . . ¶Rubber Director Jeffers wants show down on who gets what equipment first, butadiene or aviation-gasoline plants. . . . ¶January manufacturing operations projected on 37 per cent national yield of gasoline, by Bureau of Mines. . . .

PRIORITIES—PAW authorized to amend, modify, revoke, revise, or otherwise change all WPB orders in M-68 series. . . . ¶Transfer of power over basic material order centralizes control, places PAW in driver's seat—but magnifies responsibilities. . . . ¶M-68-5 extended to February 1, indicating general changes may be whipped together by then. . . .

SUPPLIES—Draft on East Coast stocks checked—withdrawals continue to exceed receipts. . . . ¶Shortage of 275,000 bbl. daily in January in prospect, unless tankers are diverted—or military requirements picked up at Gulf or Caribbean ports. . . .

DEMAND—Domestic crude requirements to increase 4 per cent first quarter, Bureau of Mines forecasts. . . . ¶Decline of 12 per cent in total motor-fuel demand predicted. . . . ¶Diminishment of crude imports chief factor in boosting domestic needs. . . .

Refinery-Conversion Phase Of Rubber Plans Explained

by Henry D. Ralph

WASHINGTON, D. C.—Oil refineries are now being converted to produce between 100,000 and 125,000 tons of butadiene per year in accordance with the Baruch rubber committee's recommendations, according to a progress report on the conversion program submitted to a subcommittee of the Senate committee on agriculture by Bruce K. Brown, assistant deputy petroleum administrator for war, on January 6.

The Baruch report recommended obtaining 100,000 tons of butadiene from converted refineries in addition to the three refinery-conversion projects in progress at the time of the report was made and Mr. Brown's review indicates that all contemplated conversions for butadiene now have been authorized.

If the conversion program had been given the "green light" at the time it was first proposed by the oil industry and the Office of Petroleum Coordinator (now PAW), Mr. Brown said, the "quick butadiene" plan could have lived up to its name and could have been producing this essential ingredient of synthetic rubber many months prior to wholly new plants. At various times, OPC presented programs which would have produced upwards of 300,000 to 400,000 tons of butadiene per year. But there were so many delays in approving the plans that many of the converted refineries will not be producing butadiene any earlier than plants built specifically for that purpose.

Mr. Brown's report gave many hitherto unpublished details of the refinery-conversion program and of some of the projects in the list. He also submitted a carefully worded statement on the competition for butylene between the synthetic-rubber and aviation-gasoline programs.

The subcommittee, headed by Sen. Guy M. Gillette of Iowa, has been investigating the rubber program for nearly a year, concentrating particularly on the use of agricultural products in making rubber.

The committee has been critical of the large share in the program allotted to the petroleum industry, and questions of Mr. Brown and other witnesses who have testified before it recently appear to have been based on a belief that the petroleum butadiene projects have been more costly than plants to make butadiene from alcohol and that the petroleum products interfere with the aviation-gasoline program.

In his prepared statement, Mr. Brown related the history of the refinery-conversion program, explaining how it had to be fitted into the 100-octane plans, which were started earlier. He declared that the oil companies did not want to convert their refineries and regarded the improvised plants as undesirable, but that because of the need for butadiene they cooperated in the program and spent more than $1,000,000 of their own money in research last summer.

Mr. Brown submitted a table showing the locations and capacities of the three butadiene-conversion projects authorized at the time of the Baruch report and the 11 projects approved since.

Estimates for costs of new materials needed in the 11 new conversion projects were as follows: Arkansas Fuel, $138,000; Lion Oil, $235,600; Eastern States, $243,000; Southport, $545,000; Pan American, $418,000; Humble and Taylor together, $679,000; Standard of Indiana, $5,865,000; Ohio Oil, $100,000; Magnolia, $661,000; Standard of California, $2,815,000.

Questioned on High Cost

Mr. Brown was questioned particularly about the Standard of California project because of its relatively high cost and because of local disappointment that proposals to make butadiene from alcohol from waste fruits had not been approved. Mr. Brown explained that it was desired to have a synthetic-rubber plant in California and that the butadiene project originally approved for the Southern California Gas Co. was planned to use motor gasoline as the raw material but would yield only about 4 or 5 per cent of butadiene. He said that California is now refining 100,000 bbl. per day more than it is producing so the original plan was abandoned and the Standard plant will operate on butane by the Houdry process.

In his statement on refinery conversion and competition for butylenes, Mr. Brown said:

"When the idea of converting refining equipment to butadiene was first discussed by us with industry and informally with Rubber Reserve representatives in January 1942, the scheme did not meet with much favor. At that time the only process which appeared to be feasible was one using gasoline or the equivalent as the raw material. The plan involved cracking gasoline in existing units in petroleum refineries. In order to produce butadiene it was necessary to raise the cracking temperature some 500° or, expressed in another way, to raise it to a temperature far above that which the cracking units were designed to withstand, in fact, a temperature which it was felt would very quickly ruin the metal in the tubes in the cracking furnace. In addition to this disadvantage, the yield of butadiene to be ob-

Bruce K. Brown, assistant deputy petroleum administrator (right), reporting to the Gillette committee on progress of the refinery conversion program. Others in the picture are (clockwise) Sen. Raymond E. Willis of Indiana (back to camera), newly appointed member of the committee; Sen. Elmer Thomas of Oklahoma; Chairman Guy M. Gillette of Iowa, and Paul E. Hadlick, committee counsel

tained by this procedure was on the order or 4 or 5 per cent. Contrasted with this small yield of butadiene, more than half of the gasoline thus treated would be converted to permanent gases such as those present in natural gas. The 4 or 5 per cent of butadiene obtained from the gasoline would be mixed with a number of other hydrocarbons and would provide a very difficult problem of separation and purification.

"Although this possibility of manufacturing butadiene by thermal cracking was based on technical knowledge some of which went back several decades, very little was known about the technical problems involved in operating cracking units to produce butadiene, and an enormous amount of experimental and engineering work was necessary to solve these problems.

"As of that early date the construction-material situation was not so bad as it later became and those in authority did not conceive that it would take so long to build and operate the new plants which were the alternative to the conversion of existing equipment. The argument against refinery conversion and for the use of new equipment was primarily that by building new especially designed plants it would be possible to produce butadiene in much larger quantities in proportion to the raw material charged and consequently the problem of separating and purifying the butadiene would be correspondingly simplified.

"As of the time of which I am speaking, it was planned to produce butadiene in new plants using as a raw material in gasoline a mixture of about 70 per cent butane and 30 per cent butylene, such as was thought could easily be obtained from the petroleum refineries as a byproduct of their normal operations.

Butane Uses Explained

"There are two butanes—that is, isobutane, which is useful in making aviation gasoline, and normal butane which can be used to make butadiene. In order to make butadiene from normal butane, the isobutane must first be removed but there are very large quantities of normal butane available, some of it in already purified form. butylene to which I have referred would be available mixed with the butane as the result of refining operations, although butylene itself does not appear in nature and always occurs as the result of a petroleum cracking operation of some sort. New plants using the raw material which I have mentioned and operating on the mixture of butane and butylene to produce butadiene by catalytic dehydrogenation looked so attractive that the suggestion of converting existing refining equipment was not well received.

"The situation which I have endeavored to describe was that which prevailed in March 1942. After that several things happened which tended to modify the attitude of those in authority towards the conversion of existing refinery equipment to produce low yields of butadiene by relative costly methods measured by peacetime standards. I wish to refer to these changes in the situation briefly in order to clear up some questions which have been asked about the so-called 'quick butadiene' phase of the program of converting petroleum refineries to wartime uses.

"First, and perhaps most important of all, a decision was reached by Rubber Reserve Co. officials that it would be desirable to change the plan for the new plants in such a way that they would operate, not on a mixture of 70 per cent butane and 30 per cent butylene, but on pure butylene. The principal argument for this was that the process would be greatly simplified by eliminating the step of converting butane to butylene, thus greatly reducing the usage of critical construction materials in the new plants. Our office insisted that the cracking equipment and equipment for segregating the butylene be minimized, and worked with Rubber Reserve in the development of the most economical way of carrying out Rubber Reserve's plan of using butylene alone as a charge stock. Despite the expenditure of a substantial amount of critical construction materials to make and segregate the butylene or to replace it in refineries which had planned to use butylene in 100-octane aviation-gasoline manufacture, there are some real advantages in simplicity and certainty of operation, since the type of unit previously under contemplation to work on butane to produce butylene before converting the butylene to butadiene was anticipated to be one which would cause more operating difficulty than other parts of the process.

"A second factor which became apparent at the time and which was vastly more important, was the bitter experience which we had been having in prosecuting the 100-octane construction program, namely, that the demands of other war programs for critical construction material and more particularly for fabricated vessels, compressors, valves, etc., were so great that it became quite evident that plants of any sort, whether aviation gasoline or synthetic rubber, could not be built as rapidly as had been anticipated.

AUTHORIZED REFINERY CONVERSION BUTADIENE PROJECTS*

(January 4, 1943)

Company—	Location	Capacity, tons per year— Production	Purification
Authorized before Baruch report:			
Atlas Oil & Refining	Shreveport	8,000 to 10,000	At Ark. Fuel
Sun Oil Co.	Toledo, Ohio	15,000	15,000
Standard Oil Co. of Louisiana	Baton Rouge, La.	6,860	14,000
Authorized after Baruch report:			
Arkansas Fuel Oil	Bossier City, La.	3,500	18 to 20,000
Lion Oil Refining	El Dorado, Ark.	6,700	At Ark. Fuel
Eastern States Petroleum	Houston, Tex.	12,800	12,800
Southport Petroleum	Texas City, Tex.	8,000	18,000
Pan American Petroleum	Texas City, Tex.	10,000	At Southport
Humble Oil & Refining	Ingleside, Tex.	7,000	12,500
Taylor Refining	Corpus Christi, Tex.	5,500	At Humble
Standard Oil Co. (Indiana)	Wood River, Ill.	41,500	45,000
Ohio Oil	Robinson, Ill.	3,500	At Indiana
Magnolia Petroleum	Beaumont, Tex.	15,000	15,000
Standard Oil Co. of California	El Segundo, Calif.	15,000	15,000

*Excludes new plants designed exclusively for butadiene production.

Houdry Process

"For completeness, I may mention also that it was about this time that the Houdry spokesmen first announced their process for making butadiene directly from butane and vigorously advocated the adoption of this process. The Houdry butadiene process which was then disclosed, while the same in principle as the Houdry quick butadiene process which I shall discuss later, was not submitted as a method of converting existing refining equipment for the production of butadiene but as an alternate type of new plant which it was alleged would give better results and take less construction materials.

"Throughout the period March to May 1942, Wright W. Gary, then director of refining for our office, urged upon those in authority in the rubber program the desirability of adopting the idea of refinery coversion to produce a considerable amount of the needed butadiene, partly because the butadiene could thus be produced more quickly and partly because the use of the existing refineries would greatly reduce the amount of critical construction material required for this particular war program. In May the situation became such that we received some informal encouragement from those in authority to the effect that if specific operable schemes could be presented to them, they might be adopted.

"In the meantime, the Petroleum Industry War Council had appointed a synthetic rubber committee composed of the heads of several petroleum refining companies, and this

(Continued on Page 28)

WHAT THEY ARE SAYING—

No sooner had last week's copies of the Journal been delivered than readers began letting us know what they thought about the changes that have been incorporated in its size and format. Extracts from a few typical letters, enthusiastically expressing satisfaction, appear here.

SKELLY OIL CO.

I have now had in my hands for several days the new reduced-size format of The Oil and Gas Journal. I have thus given the new size the test of use, and I am very much pleased by this change. The magazine is easier to hold, easier to read, occupies less room on a desk or in a file, and can be thrown into a traveling bag with greater facility.

At the weekly luncheon of our officials, department heads and key men today, I took a poll on the new format versus the old. The vote was cast unanimously for the new format.

I have been reading The Oil and Gas Journal continuously for 29 years. It has been exceedingly useful to the oil industry during that time, and I think in the future its usefulness will not be diminished, but instead will be enhanced, by the change in its form.

CHESLEY C. HERNDON,
Vice President and Counsel

CONTINENTAL OIL CO.

I like your new magazine very much. While I have a nostalgic affection for the old form—you could never mistake it for any other magazine—the new one appeals to me very much more, seems to read easier, and handles better these busy days. I congratulate you on the change, and hope enough people will agree with me so as to make the new form stick.

WALTER MILLER,
Vice President

I have just received the first copy of The Oil and Gas Journal published on the new sized paper. Permit me to congratulate you. It is more compact, saves filing space, and is much easier to carry in your brief case when on a trip. I think this change has improved your magazine and shows your patriotic spirit in conserving paper.

A. L. WEST

I have just received my January 7, 1943, copy of "The Oil and Gas Journal" and want to compliment you on putting it out in the new form.

The new size permits of easy carrying in a brief case; page clippings fit in standard letter files; and special cases are no longer required for filing the weekly issues as they are published. I like like the new size very much better than the old and hope you retain it permanently.

E. O. BENNETT,
Chief Petroleum Engineer

STANOLIND PIPE LINE CO.

Congratulations. The new form of the Journal is a fine improvement in your publication. Its appearance is better and it is much more convenient to carry. The standard size should be most helpful in filing. Engineers and operating men who make clippings will appreciate this feature. In my opinion the change will please the oil industry.

WILLIAM G. HELTZEL,
Vice President

WARREN PETROLEUM CORP.

It is a little difficult to become accustomed to the smaller sized Journal and yet, on the other hand, it is much more beneficial to us to have it in the smaller size. In the first place, articles which are cut out and saved for future reference will now fit in the ordinary files without folding, as was necessary in the past. In the second place, the magazines themselves were more difficult to file, inasmuch as the average bookshelf is approximately 12 in. high and the former Journal did not fit. I wish to congratulate you on the new size of the Journal and express my personal feeling that I like it much better than the former and larger size.

H. W. HARTS,
Vice President

H. F. WILCOX OIL & GAS CO.

I like the new size of The Oil and Gas Journal very much. I think it is much more convenient for handling and that its appearance is greatly improved. As to the contents, they appear to be up to their usual high standard.

F. H. DUNN,
Executive Vice President

OKLAHOMA PIPE LINE CO.

I am pleased to note a betterment in the Journal's size as it is more convenient to read and to handle when checking for certain information. I also wish to express my appreciation for the splendid article written by Paul Reed, "Pipe Lines Will Compete With Ocean Tankers." We were particularly interested in the costs of operating a 24-in. crude line.

PAUL GRIFFIN,
President

AMERADA PETROLEUM CORP.

My congratulations to you for the improvement made by changing the size of The Oil and Gas Journal. I had anticipated such an improvement and was not in the least disappointed. The new size and format seem much more readable and I believe this is primarily because of the change in size.

I think your addition of a digest of federal orders will be of real value to many of your readers and of interest to all of them.

C. V. MILLIKAN,
Chief Production Engineer

MID-CONTINENT PIPE LINE CO.

Congratulations on the Journal in its new form! I found it comprehensive, concise, and the section devoted to the "Big Inch" most interesting.

J. M. LINEHAN,
General Superintendent

NATURAL GASOLINE ASSOCIATION OF AMERICA

The Oil and Gas Journal in its new format came to my desk this morning and I want to be one of the many who will congratulate you on its appearance. Granted it seems a little odd at first, but the many assets of the new form, particularly for readers, will soon become apparent to those who may miss the old size.

It was a courageous move but it is

About the Journal

in keeping with the times not only from the standpoint of the saving of paper and production costs but also the saving of time for readers. Fewer words but all the essential facts will give the shorter articles a definite appeal in these days when the oil industry is entering its greatest period of change. However, the smaller pages offer no handicap to presentation of the longer stories with important details which you have always carried in the past.

The new type style is easy to read and the new departments are welcome. It is a generally fine job and I'm sure it will have a reader acceptance that will be very gratifying to you and your entire staff.

WILLIAM F. LOWE,
Secretary

VICKERS PETROLEUM CO.

I like your new package very much; in fact it is much more convenient than the older form and I hope you will continue this size publication.

C. L. HENDERSON,
President; President Western Petroleum Refiners Association

BARECO OIL CO.

I think the change in size of the Journal is distinctly an improvement. Ordinarily I take the Journal home with me as I do not find time to read it thoroughly while in my office. The new size is easier to hold when it is not laid out on a desk. I cannot see any objection whatever to the change.

O. L. CORDELL,
President

PHILLIPS PETROLEUM CO.

I wish to compliment you and to advise that I feel that it is a great improvement. I think your objective has been reached.

C. P. DIMIT,
Vice President

HERCULES TOOL CO.

I received and just now completed reading the first issue of The Oil and Gas Journal in its new dress. It's a dandy. I like the editorial page and the new arrangement throughout. Easier to read and handle and I should say perfect in every detail. Please accept my congratulations for a job well done.

S. P. TSCHAPPAT,
President

LEO RANNEY

Congratulations on the appearance of the current issue of the Journal. As they would say in Australia, it's the "dinkum" oil.

LEO RANNEY

FIRST NATIONAL BANK & TRUST CO.

Just a note to congratulate you on the new size and makeup of The Oil and Gas Journal commencing with the January 7, 1943, issue. One does not realize what a change like this means until you actually see it and use it. I think it is a great improvement.

Just so I don't pass up a little commercial plug, I am also glad to note we are fortunate enough to have a small ad in this first issue of the new size as I am sure you will keep the first issue as one of your souvenirs for a long time and I am glad our name is in it.

R. OTIS McCLINTOCK,
President

CUSHING REFINING & GASOLINE CO.

We indeed like the new dress of The Oil and Gas Journal. We think you have very materially improved the Journal.

REX H. WINGET,
Vice President

DAILY OKLAHOMAN

This week's edition of The Oil and Gas Journal in new form came in an envelop; on first glance nothing has been sacrificed except size . . . and now maybe we can read it on the street car without sideswiping the other passengers.

CLAUDE BARROW,
Oil Editor

BRITISH-AMERICAN OIL PRODUCING CO.

I have just finished going through your new edition of The Oil and Gas Journal and can say that I prefer the newer and smaller form very much over that of the old magazine. The size of the book lends to easier handling and easier reading, and I am sure that after a few editions it will be much easier to find articles of particular interest.

C. D. MILLER,
Vice President, Production Dept.

BELL OIL & GAS CO.

Today the first issue of The Oil and Gas Journal in its new form arrived at our office. Since we subscribe for quite a large list for distribution to the key men of our organization in all its field offices and branches. I was naturally curious to see whether the reduced size would mean reduced value. I find, however, that there has been no contraction in the editorial or informative value of your magazine.

It just happens that Paul Reed's article entitled "Pipe Line Will Compete With Ocean Tankers," caught my eye and I am compelled to acknowledge that this is a masterly piece of work in careful estimating of costs. It is difficult enough to write a good article on Cost Accounting based on actual experience. Consequently, I cannot help admiring Mr. Reed's analysis made not on the specific experience of the "Big Inch" pipe line, but on general experience in its application to a new project.

I. A. ANSON,
Vice President

DOWELL INCORPORATED

After a few of us had a chance to look through the new book rather carefully, we have decided that the magazine has been improved materially, and we are wondering why it was not done a long while ago. One of our men liked the new size because he could carry the Journal more easily in his brief case. Another was pleased with the change because he clips the Journal and finds the new size pages easier to file. We feel the layout of the new Journal has been improved and that it is more easily readable.

R. D. SHAW,
Sales Manager

DEEP SAND OIL CO.

In addition to other improvements, I like the new size of the Journal very much.

N. L. WEBSTER,
Secretary-Treasurer

State Capitals

Water-Oil Ratio Order in East Texas Attacked in Injunction Proceeding

AUSTIN, Tex.—Testimony in an injunction proceeding against enforcement of the Railroad Commission's water-oil ratio in East Texas was under way here this week. Numerous attorneys and technical witnesses appeared in 98th District Court to support and challenge the injunction sought by certain operators seeking to restrain the commission from enforcing its water-oil ratio order. Several days, possibly as much as 2 weeks, will be required to hear the witnesses arrayed to testify on the legality of the order.

The order became effective January 10 after being postponed from December 1, 1942, and it limits water production in the field to 10 times the oil allowable (approximately 200 bbl. of water) for each well in the field. Application for the injunction was made by Konawa Oil Co. with a similar case being filed in the 126th District Court by Roosth and Genecov. The latter case has not yet been set for hearing.

The Railroad Commission announced last week that as a result of its water-oil tests on the properties involved, it found that 348 wells would be affected. There are more than 26,000 wells in the pool. All of the wells making a high water-oil ratio are on the western edge of the pool in Upshur, Gregg, Smith, and Rusk counties.

On January 10 the 100 proratable and 248 marginal wells in question had their allowables reduced 1,739.23 bbl. Fifty-nine of the wells were reduced to less than 5 bbl. allowable oil per day while one well was reduced from 5.52 bbl. to 0.98 bbl. daily. A proratable well, making 20 bbl. per day, was cut to 6.55 bbl. of oil.

Heaviest hit was General American Oil Co. which took an allowable cut of 107.75 bbl. daily on 23 wells, Sklar Oil Corp. which had its allowable reduced 98.33 bbl. on 16 wells, and Roosth and Genecov which suffered a cut of 94.17 bbl. on 21 wells.

Where an operator is reinjecting the water produced in excess of the 10 to 1 water-oil ratio, his oil production is not affected. It is estimated that by February 1 there will be approximately 200,000 bbl. of water returned to the Woodbine sand daily.

Contention of these seeking to enjoin the commission is that the water-oil ratio rule is unnecessary in view of the transfer-allowable plan discussed before the commission, that the water-oil ratio plan which restricts production from marginal wells is contrary to the state's marginal well law, and that the order is confiscatory and a violation of the due process clause.

Those supporting the order point to state's original conservation statute as giving the Railroad Commission power over all wells, the absurdity of considering any statute an umbrella under which an operator could do great damage to a reservoir simply because his wells were below the proratable class, and the fact that the rule sets out a means whereby the operator may comply (reinjection of the salt water) with the rule and prevent avoidable waste which the order seeks to prevent.

The water-oil ratio order was issued after a number of hearings devoted mainly to the discussion of a transfer-allowable plan and a meeting at which Railroad Commission engineers testified as to the advantage of the water-oil ratio method of controlling water production and total volumetric withdrawals from the field as a means of sustaining the bottom-hole pressure above 1,000 lb.

TEXAS

THE RAILROAD Commission's Kilgore office last week issued orders for the first transfer of allowables from wells which ceased to flow to those still flowing under exemptions from Rule 23. The exemptions were granted so that the producers could maintain their output in the face of the unavailability of pumping machinery with which to equip wells.

Ohio Oil Co. was permitted to transfer the allowable of four wells, Sinclair Prairie Oil Co. was authorized to transfer the allowable of 65 wells, Calstron Petroleum Co. 1 well, Humble Oil & Refining Co. 6 wells, and Tide Water Associated Oil Co., 4 wells.

Other applications for transfers were filed by Gulf Oil Corp., Tide Water and Texon Oil Co.

THE NEXT state-wide hearing of the Railroad Commission, at which nominations for February production and purchases will be received, will be held in Dallas, January 15, according to an announcement from Beauford Jester, chairman. The meeting is scheduled for 10 a.m. at the Baker Hotel. Meetings will probably be held at cities other than Austin while the legislature is in session.

Mr. Jester has requested Petroleum Administrator Ickes to submit his estimate on requirements of oil from Texas during February in advance of the meeting.

CALIFORNIA

Ernest E. Pyles, who resigned about a year ago as vice president of Hancock Oil Co. and Long Beach Oil Development Co. in order to be free to devote his entire time to the California conservation program has been retained by the Conservation Committee of California Oil Producers as coordinator for the organization. He will consolidate activities of the committee and other government agencies dealing with California oil production.

Appointment of Mr. Pyles has met with approval of oil producers who feel there has been a need for such an office. The committee has assigned Mr. Pyles the task of smoothing out many complex problems that have worried California operators.

His first job will be to straighten out the problems confronting operators in the Coles Levee field in order that they may resume production.

the OIL AND GAS JOURNAL

PRODUCTION - TRANSPORTATION
REFINING - NATURAL GASOLINE

Founded in 1910 by
PATRICK C. BOYLE

Why All the Secrecy About Oil?

THE findings of PIWC's economics committee relative to petroleum shortages pose the question of why there has not been greater frankness in handling this problem which has brought more discredit to the war administration than anything that has happened since Pearl Harbor.

The same unsatisfactory situation applies to the production of aviation gasoline and synthetic rubber and certain phases of oil transportation.

The excuse for this hush-hush policy is that any discussion of these petroleum matters comes under the military ban of giving aid and comfort to the enemy. It is entirely proper to give the latest figures on the production of airplanes, tanks, and ships. In fact these accomplishments are constantly pointed to with pride by administration leaders.

But when it comes to telling what must be done to fuel and lubricate these tens of thousands of war units the secrecy cloak folds completely. Nothing must be said about the production plans for 100-octane gasoline because if the enemy find out he will know how many airplanes we can use against him. This ruling emanates from the same source that gives out the airplane production figures.

In regard to synthetic rubber the ban is even tighter. The "know how" cannot be revealed because the Axis powers might pick it up and do likewise. They haven't the petroleum nor the materials to do it with. Moreover, they have known the chemical principles involved for years.

As to shortages which have come entirely from the cutting off of tanker transportation and the loss of natural rubber supplies in the Far East, why should there have been any restriction on the free discussion of these disasters as to causes, effects and remedies? The enemy knew what would happen long before our own experts did.

Oil operators accurately analyzed the problems resulting from these early war developments from the start and had the only possible answers. An ostrichlike attitude and the absence of coordination at Washington are responsible for the present crisis which obviously does not lend itself to secrecy and from which no doubt the Axis is getting a measure of comfort and more probably a laugh or two.

The oil business and its customers have been the goat of this concealment and the entire war effort will suffer if the same policies are continued.

This country and all of its allies should be made to understand that the tens of thousands of motorized war units, airplanes and ships will stay at the factories and at the docks unless the petroleum industry is given the same consideration in materials that has been given to other manufacturers of the most essential war products. A pooling of construction and operating information is obligatory.

The manpower situation in which thousands of experienced workers and key technical men have either gone into the military services or were enticed to leave the fields and refineries to work in the manufacturing plants of other industries must have special consideration.

It is far better to air the fact now that certain aviation units, after months of delay, are still in the concrete-construction stage and that some of the large butadiene plants are hardly more than started, than to concede later in the year that those programs are behind schedule. Washington must take this industry's war needs from the bottom of the file and place them on top.

PIWC Paints Dark Picture

Monthly meeting of committee largely devoted to discussion of oil prices and supply problems

WASHINGTON, D. C.—The monthly meeting of the Petroleum Industry War Council held in Washington January 7 and 8 was devoted largely to discussion of oil prices and the East Coast supply situation.

The committee on petroleum economics submitted its usual report on supply and demand which painted a dark picture of prospects for consumers in Atlantic Coast states during the remainder of the winter heating season.

Sumner Pike, new head of the Fuel Price Section of the Office of Petroleum Administration, met with the council and heard a number of impassioned pleas for increased prices for crude oil and products. What reply he gave the oil men, if any, was not announced, but it was learned that the PIWC committee on cost and price adjustment is still working on detailed data which OPA has requested as the basis for final consideration of price changes.

The various standing and special committees of the council made reports but these were not made public except a special report on tubeless tires which recommended that appropriate government agencies study the subject.

Petroleum supply deficiencies on the East Coast averaging 345,000 bbl. a day in January and 203,000 bbl. a day in February, but figured before announcement of the latest reductions in fuel-oil rations and the ban on all pleasure driving, were forecast by the council's economics committees.

Recent Savings Excluded

Extent of the savings from the recent actions of the OPA were not included in the estimates, but the report stated that possibly 75,000 bbl. a day could be conserved by measures which it recommended, and which were similar to those taken by the OPA since the estimates were made on December 31.

The council's committee on economics revealed that East Coast stocks of all petroleum products already are at critical levels and are declining at an alarming rate.

The committee reported that 75,000 bbl. a day probably can be pared from gasoline and heating oil consumption, by the new restrictions adopted since December 31, without actually harming the health and the war effort on the East Coast.

Committee hears that East Coast stocks are already at a critical level, and are declining at an alarming rate. Forecast was made that supply deficiencies will average 345,000 bbl. a day in January and 203,000 bbl. a day in February, although possibly 75,000 bbl. a day could be conserved by new measures instituted by OPA.

Even with this prospective decrease in consumption of 75,000 bbl. a day, the January supply would still be 270,000 bbl. a day under consumption, and the February supply 128,000 bbl. a day less. Part of this can come from stocks in certain areas, but there is still a gap of about 90,000 bbl. a day for the 2-month period. This will mean serious hardship in many places unless, for a short period, more military requirements can be taken from sources other than the East Coast or a few more tankers can be spared without impairing our first responsibility of supplying our military forces and our allies with the petroleum products they need.

The committee suggested that new tankers might spend their break-in periods carrying oil from the Gulf Coast to the East Coast, which would have the added advantage of facilitating repairs and adjustments.

The committee recommended that, in future rationing programs, the outstanding coupons be more closely adjusted to supplies available, in order to avoid the imposition upon the supplier of the decision as to priorities in dispensing such supplies. Other recommendations included a new plea to the petroleum administrator to obtain compensation for the small refiners who have been obliged to make operating changes that are threatening their solvency.

Major Shortage Factors

"The major factors contributing to the shortage," the committee reported, "which have been intensified since the last report are:

"1. The sudden imposition without adequate notice, of large and concentrated requirements for military export upon an already tight East Coast situation.

"2. The actual rationing measures were not effective in reducing demand to the extent estimated by the OPA. This bore out the doubts expressed on this point in last month's report of this committee.

Estimates of District 1 Supply and Demand

(Figures in thousands of barrels)

	Jan. 1943	Feb. 1943	Mar. 1943
Supply based on available information			
Local production	80	80	78
Receipts—by tank cars (incl. effect of War Emergency Pipeline)*	714	780	875
—by pipe lines	172	189	190
—by barge and lake tankers	95	107	106
—by ocean tankers	85	70	70
Total supply	1,146	1,226	1,319
Demand based on OPA restrictions in effect December 31, plus military			
Local and export—gasoline	495	483	476
—kerosene	167	145	134
—distillate fuel oil	363	355	314
—residual fuel oils	338	318	313
—other	107	107	115
To other districts	21	21	21
Total demand	1,491	1,429	1,373
Current deficiency—supply vs. demand	—345	—203	—54

*Estimates of the PAW Division of Transportation.

"3. Continued reductions in tank-car and ocean-tanker deliveries. Flood and other weather conditions reduced average tank-car shipments for the week ended December 26 to 700,000 bbl. daily for the first time in several months.

"Under these circumstances it is clear that, unless more tankers can be spared for East Coast service (or in the alternative more of the offshore military requirements taken from sources other than the East Coast) it will be necessary for consumption to be reduced drastically below the estimates given in the accompanying table. This will mean not only the elimination of such nonessential demand as is being supplied, but also cutting into essential requirements.

"In regard to the relatively small amount of nonessential demand which it is believed is supplied, the committee feels that the current indicated deliveries of gasoline into domestic consumption are still about 40,000 bbl. per day greater than required for minimum essential needs. To the extent that the present basis of allowance of 3 gal. per unit on "A," "B" and "C" coupons permits any nonessential driving, these unit values should be reconsidered. All indications are that the "S" coupons originally issued allowed for commercial consumption substantially above normal, and there is no indication that the substitution of "T" for "S" coupons has, as yet, entirely eliminated this condition.

"The recent reduction of 10 per cent in coupon values of fuel oils for heating has been announced since these figures were prepared. It is estimated that this will reduce consumption by about 40,000 bbl. daily before allowance for any supplemental rations which this reduction might occasion. The net effect of this change on the estimated deficiency should be a reduction of 30,000 to 35,000 bbl. per day.

"Even with prospective decreases in consumption, the January supply would still be 270,000 bbl. daily under consumption and a deficiency for February of 128,000 bbl. daily. Part of this can come from stocks in certain areas, but there is still a gap of about 90,000 bbl. daily for the 2-month period. This will mean serious handicap in many places unless, for a short period, and if consistent with military requirements, more of the military offshore supplies can be taken from sources other than the East Coast or some tankers made available for East Coast service. As a matter of fact, much of the necessary increase in tanker transportation to the East Coast could be attained by having new tankers spend their break-in period along the East Coast where adjustments and repairs can be made more readily.

"In regard to the situation outside of District 1, while revised forecasts for the other districts are not included, the problem of balancing refinery runs and product yields in Districts 1, 2 and 3 has become more serious. This, as previously pointed out, is complicated by the necessity of maintaining levels of minimum crude runs to stills and gasoline production required by refineries producing essential war products, such as aviation gasoline, toluene and synthetic rubber. Current reduced outlet for District 3 refineries, occasioned by reduced transportation facilities, and maladjustment of prices in certain areas, is causing stock accumulations resulting in loss of flexibility, which is being reflected in inability to take advantage of maximum potential capacity for supply of essential war products. In District 1 substantial losses in output of war products are being incurred in refineries in the district as the result of inadequate crude supplies.

Will Become Worse

"This situation will become progressively worse which emphasizes the imperative necessity of adjusting refinery runs and yields within and between districts which has been pointed to in the committee's last three reports. Studies are now in process by the refining division of the PAW, and within the various districts, and the committee urges that these studies be completed as promptly as possible, as corrective action is urgently needed to avoid current and future aggravated loss in output of essential war products. Since such corrective measures will heavily penalize small refineries not producing war products, but supplying needed fuel to railroads and war industries, and since they will have to be diverted to making maximum yields of low-value fuel oils, some means will have to be found to keep these refineries solvent, as has previously been urged."

The economics committee is composed of Robert E. Wilson, chairman, president of Pan American Petroleum & Transport Co.; J. Frank Drake, president of Gulf Oil Corp.; W. H. Ferguson, executive vice president of Continental Oil Co.; John D. Gill, director of Atlantic Refining Co.; A. Jacobsen, president of Amerada Petroleum Corp.; A. C. Mattei, president of Honolulu Oil Co.; J. Howard Pew, president of Sun Oil Co.; Charles F. Roeser, president of Roeser & Pendleton, Inc.; Fred Van Covern, American Petroleum Institute, secretary; and S. P. Coleman, Standard Oil Co. (New Jersey), chairman of the working subcommittee. Economic advisers are R. S. Meriam, J. E. Pogue, and Alexander Sachs.

F. A. Watts Succeeds Orton As Director of Materials

HOUSTON, Tex.—F. A. Watts, purchasing agent for Humble Oil & Refining Co., Houston, has been appointed director of the Materials Division, Petroleum Administration for War, Washington, D. C.

F. A. WATTS

The Humble company has granted Mr. Watts a 6-month leave and his duties will be assumed by F. T. Fendley, assistant purchasing agent, during his absence from Houston.

Mr. Watts succeeds Greer W. Orton, formerly assistant manager of the purchasing department for the Texas Co., New York. Mr. Orton served the federal oil agency from July 1 until the present time.

Jeffers Seeks Showdown On Rubber-Plant Steel

WASHINGTON, D. C.—An immediate showdown on priorities for critical materials to complete synthetic rubber plants is being sought by Rubber Director William M. Jeffers.

On several recent occasions Mr. Jeffers has stated that the nation faces disaster unless these plants are completed in time to get into full production by this fall, and that rubber plants should get priorities over aviation gasoline, ships, tanks, and other war demands for steel and similar materials.

The chief competition for the types of materials needed by the synthetic rubber plants comes from the 100-octane gasoline program, and it is understood that the Petroleum Administration for War, acting under instructions from the War Department, is insisting that this program not be delayed by giving preference to the rubber program.

Crude-Oil Demand to Rise 4 Per Cent This Quarter

THE FIRST QUARTER OUTLOOK

Demand for domestic crude oil to average about 3,910,000 bbl. daily during the first quarter of 1943, a gain of almost 4 per cent.

Crude runs to stills to average around 3,700,000 bbl. daily, about 1 per cent under the first quarter of 1942.

Domestic motor-fuel demand to be down about 13 per cent, total requirements about 12 per cent from a year ago.

Projected operations are based on refinery yield of gasoline averaging 37 per cent on crude charged to stills.

These conclusions are from the Bureau of Mines monthly forecast for January prepared under the supervision of A. G. White, chief, Petroleum Economics Division.

THE daily average supply of domestic crude oil estimated by the Bureau of Mines to meet the market demand in January is 3,912,900 bbl., or about 17,000 bbl. daily more than the actual for January 1942.

Current situation.—Daily average crude-oil production and total runs to stills during the 5 weeks October 31 to December 5 were 3,868,000 and 3,736,000 bbl., respectively. During this period stocks of domestic crude oil declined an average of 159,000 bbl. daily, indicating a demand for domestic crude of 4,027,000 bbl. daily.

General situation. — Current data available for the fourth quarter of 1942, compared with the same period of 1941, indicate a decline in total motor-fuel demand of about 13 per cent. The demand was higher than anticipated due to unusual government purchases, larger exports, and advance buying and stocking in October and November that offset the effect of the extension of rationing in December. For the fourth quarter of 1942, the Bureau of Mines estimates that crude runs averaged about 3,720,000 bbl. daily and that the gasoline yield from crude was about 38.2 per cent, both items showing a downward trend during the quarter. Demand for domestic crude averaged about 3,940,000 bbl. daily, involving a production of 3,875,000 bbl. daily and withdrawals from stocks of about 65,000 bbl. daily.

Gasoline Slump Predicted

The bureau anticipates a decline of about 12 per cent in total motor-fuel demand during the first quarter of 1943 compared with the same period in 1942. It is expected that crude runs to stills will average about 3,700,000 bbl. daily, or less than 1 per cent below the first quarter of 1942, and that the demand for domestic crude petroleum will approximate 3,910,000 bbl. daily, a gain of almost 4 per cent. The gain in the demand for domestic crude petroleum, in spite of an expected material decline in the total demand for all oils, will be due to the reduction in total imports and to a more normal change in refined stocks as compared with the abnormal withdrawal of over 27,000,000 bbl. in the first quarter of 1942. While refined stocks in District 1 may be reduced to economic minimums, they may be built up in other districts in anticipation of war needs and of the completion of new transportation facilities.

Motor-Fuel Situations

Total demand.—The demand for motor fuel in January is estimated at 44,800,000 bbl., or 14 per cent below that of January 1942.

Stocks.—Finished and unfinished gasoline stocks amounted to 76,622,000 bbl. on October 31. Statistics of the American Petroleum Institute indicate that these inventories declined about 1,200,000 bbl. during November, leaving approximately 75,400,000 bbl. on hand at the end of that month. The bureau estimates an increase of 4,400,000 bbl. during January.

Gasoline production. — Direct sales of natural gasoline are estimated at 1,600,000 bbl., making an indicated refinery production of 47,600,000 bbl. distributed among the various refining districts as follows (thousands of barrels): East Coast, inland Texas, Texas Gulf Coast, Louisiana Gulf Coast, and inland Louisiana-Arkansas, 20,610; Appalachian, 1,950; Indiana, Illinois, Kentucky, etc., 10,680; Oklahoma, 2,550; Kansas, 2,780; Rocky Mountain, 1,290; California, 7,740.

Crude Petroleum

Runs to stills.—Natural gasoline to be blended at refineries is estimated at 5,160,000 bbl. Although the estimated yield of 37 per cent is lower than has yet been reached, a higher yield would result in either deficient quantities of the fuel oils, or in excessive additions to gasoline stocks. The application of the above yield to the straightrun and cracked gasoline production of 42,440,000 bbl. gives total crude runs of 114,700,000 bbl., or 3,700,000 bbl. daily.

Exports, fuel and losses.—Crude oil for export and to be used as fuel, and losses, is estimated as 6,800,000 bbl.

Total demand.—The estimated demand for domestic crude oil is 121,300,000 bbl., or 3,912,900 bbl. daily.

SUMMARY OF FORECASTS FOR JANUARY 1943

(Barrels)

	Forecast		Actual
	Jan. 1943	Dec. 1942	Jan. 1942
Demand for motor fuel:*			
Total demand	44,800,000	47,100,000	52,192,000
Supply of motor fuel:			
Straightrun and cracked gasoline	42,440,000	42,550,000	53,049,000
Natural gasoline used at refineries	5,160,000	5,050,000	5,351,000
Total refinery production	47,600,000	47,600,000	58,400.000
Other natural gasoline and imports	1,600,000	1,700,000	1,122,000
Increase in finished stocks	4,400,000	2,200,000	7,330,000
Available supply	44,800,000	47,100,000	52,192,000
Crude-oil requirements:			
Per cent yield of gasoline from crude	37.00	37.00	44.57
Refinery crude required	114,700,000	115,000,000	119,032,000
Daily average	3,700,000	3,710,000	3,839,700
Domestic crude runs	114,500,000	114,700,000	115,022,000
Exports, fuel and losses	6,800,000	7,100,000	5,754,000
Total demand for domestic crude	121,300,000	121,800,000	120,776,000
Daily average	3,912,900	3,929,000	3,896,000
Increase in domestic stocks	.....	.....	7,486,000
Actual production	.....	.....	128,262,000
Daily average	.....	.....	4,137,500

*The term "motor fuel" as used in this report includes gasoline naphtha used for all purposes, but does not include heavier distillates used in the operation of tractors or burned in diesel engines.

War-Plant Yields Compared With Lake Charles Refinery

Exceedingly high yields of war products will be derived from the Lake Charles, La., refinery now under construction by Cities Service Oil Co. In this report to the Gillette committee, Bruce K. Brown, assistant deputy petroleum administrator, compares yields of the plant with those of some of the other facilities now being built for the manufacture of aviation-gasoline and synthetic-rubber components.

WASHINGTON, D. C.—Criticisms of the war-products refinery being constructed by Cities Service Oil Co. at Lake Charles, La., were answered last week by Bruce K. Brown, assistant deputy petroleum administrator.

He appeared before the Gillette subcommittee of the Senate which has questioned the location, cost, and slow progress of the project, apparently on the theory that the money could be spent to better advantage and with quicker results in constructing plants to make butadiene from alcohol in the grain belt.

Mr. Brown went into great detail as to the history and planned operation of this plant, giving many details which have not been previously revealed. He defended the project as being particularly efficient in the production of war material with minimum output of civilian products. He also gave figures to compare this project with the Port Neches and Houston war-products refineries.

Status of Construction

Before Mr. Brown took the stand, Chairman Gillette read into the record a letter from Charles E. Gately, attorney for Cities Service regarding the status of the Lake Charles butadiene plant. The lease agreement with Defense Plant Corp. was signed May 13, 1942, and the operating agreement was signed with Rubber Reserve Co. July 3, 1942. The plant is designed to produce 55,000 short tons of butadiene per year and the authorized expenditure is not to exceed $15,000,000.

As of January 1, 1942, the letter stated, the process design was 100 per cent complete, mechanical engineering 75 per cent complete, purchasing 68 per cent complete, materials receipts 5 per cent complete, and physical construction 3 per cent complete. The letter added that scheduled completion date is October 1, 1943, and that the construction is now on schedule and will be completed as planned unless there are unforeseen delays in delivery of materials.

Brown's Statement

In his prepared statement on the Lake Charles project, Mr. Brown said:

"The question has been raised as to the necessity or desirability of building a brand-new refinery in order to produce aviation gasoline and butadiene in contradistinction to the installation of special equipment to produce 100-octane or butadiene as mere extensions of existing refineries. The Cities Service Lake Charles refinery was formally approved by the Office of Petroleum Coordinator on March 2, 1942, although we had been working with the Cities Service people and their contractors relative to the design of this plant for about 2 months previously. It was not the first, but it was one of the first, of the new 100-octane installations approved by us and it was approved readily because it gave promise of producing a very large quantity of aviation gasoline with a moderate use of construction materials and at a very low price. The Lake Charles refinery is unique, in so far as the Petroleum Administration is concerned, in still another sense, namely, it is the only one of the butadiene plants in the original Rubber Reserve program which was specifically recommended by us to Rubber Reserve, all other recommendations of this nature by us having occurred at a much later date and having related to the conversion of existing equipment to produce butadiene.

"At the time the Lake Charles project was engineered and was recommended, it was intended to produce toluene as well and, indeed, the letter of intent which Secretary Jones issued . . . on March 7, 1942, upon our recommendation, was sufficiently broad to authorize Cities Service to proceed to erect toluene facilities as well as aviation-gasoline and butadiene facilities. . . .

"The refinery site is known as Rose Bluff. . . . A large existing tank farm comprising some twenty 80,000-bbl. tanks is on this bluff and is being incorporated in the new refinery. Ocean tankers can load directly at the refinery dock and there are also coastal canal connections with the Mississippi River and with various refining areas in Texas. . . .

Two Parts of Project

"From the standpoint of financing and ownership, the Lake Charles project divides into two parts. First, the Cities Service basic refinery which will produce 100-octane aviation gasoline, 91-octane aviation gasoline, and various other petroleum products including feed stock for the butadiene plant; and second, a Defense Plant Corp. owned butadiene plant quite similar to the other butadiene plants in the Rubber Reserve program. Cities Service's own investment in the refinery is $50,000,000 and the Reconstruction Finance Corp. is advancing 75 per cent of the investment cost on an interest-bearing loan which it is the first obligation of the company to repay. It may be remarked that this same type of financing has been used in the case of most of the other 100-octane plants. The butadiene plant, which is costing the Defense Plant Corp. $13,000,000, is being built by Cities Service as the agent of DPC. This is standard arrangement for that type of plant.

"The 100-octane and butadiene facilities at Lake Charles are all part of one project from the standpoint of engineering, construction and operation. Following the receipt of a letter of intent from the Defense Supplies Corp., proper applications for priorities for construction materials were filed on April 30, 1942, and the WPB issued these priorities on June 13, 1942.

"In April 1942 the contractor estimated that the project could be completed by October 1, 1943, and laid out a schedule which would result in the completion on that date provided there was no undue interference with the delivery of materials. This schedule was adhered to. Several months later Rubber Reserve Co. requested the Cities Service Co. to attempt to complete the butadiene plant and that part of the refinery which would deliver feed stock to it by August 1, 1943, and for a brief period the construction proceeded on the basis of such a schedule. However, at a later date the Office of the Rubber Director requested that Cities Service return to its original construction schedule, which it did. . . .

Projected Product Yields

"The Lake Charles project is one of very few in which refining technologists and engineers have had an opportunity to incorporate new technology to the fullest extent, with the result that a very large yield of war products will be obtained, based on crude oil refined. The refinery will process 70,000 bbl. of crude oil per day and will produce the following products: 16,600 bbl. daily of Grade 140, 100-octane aviation gasoline;

(Continued on Page 91)

Federal Order Digest

Petroleum Administration Orders

Spacing — Order 2: Extends provision of M-68-5, applying to certain spacing exceptions in Illinois, Indiana, and Kentucky, until February 1, effective January 8.

WPB Conservation Orders

Materials—M-68, amended: Authorizes Petroleum Administrator for War to amend or revoke conservation orders of the M-68 series, effective January 4.

Alkanolamines — M-275: Provides direct allocation for monethanolamine, diethanolamine, and triethanolamine, to divert supplies into essential refining and pharmaceutical manufacture, effective January 9.

Steel — M-21-d, Interpretation 3: Authorizes fulfillment of orders for corrosion and heat-resistant steel, if approved on Form PD-707, even if rated lower than AA-5. Previously, Interpretation 2 made similar provision for orders rated on Form PD-391, effective January 9.

Controlled Materials—Regulation 2: Establishes inventory restrictions on aluminum, copper, and steel for manufacturers and other users to maximum of 60 days' forward requirements, effective January 7.

Steel—M-21-a: Letter from Director General for Operations abrogates order so far as concerns 1,000-lb. lots of National Emergency Steels and plain carbon steels for experimental and testing purposes, effective December 31.

Manila Cordage—GPO M-36, Amended: Imposes tighter restrictions on manila fiber and cordage, narrows list of uses for which it can be sold, effective January 4.

WPB Limitation Orders

Semitrailer Tanks—L-1-G: Authorizes production of 500 additional semitrailer petroleum tanks of 4,000-gal. capacity, effective January 7.

OPA Rationing Orders

Fuel Oil—RO 11, Amendment 20: Grants large consumers of light fuel oils (100,000 gal. per month or more) privilege of obtaining delivery receipts instead of regular coupons, effective January 2.

Fuel Oil—RO 11, Amendment 21: Reduces value of fuel-oil coupons by 10 per cent in 17 eastern states and District of Columbia, effective January 4.

Fuel Oil—RO 11, Amendment 22: Defines "primary supplier" as, with two exceptions, first person in point of time who has possession of fuel oil within the limitation area, other than as a carrier, effective January 15.

Fuel Oil—RO 11, Amendment 23: Reduced by 25 per cent the value of all fuel-oil coupons used for heating buildings other than dwellings, in 17 East Coast states, effective January 7 (noon).

Tires—RO 1-A, Amendment 5: Designed to build up dealer inventories of used, repaired, and recapped tires for speedy transfer to wheels of essential cars, effective January 20.

Gasoline—5C, Amendment 9: Provides supplemental gasoline, up to 65 per cent or 8,600 miles, whichever is less, for salesmen distributing essential commodities, effective January 8.

Gasoline—5C, Amendment 10: Authorizes special motor-fuel ration when needed to tow trailers to new locations, effective January 7.

OPA Price Orders

Coal—MPR 112, Amendment 10: Grants ceiling-price increase of about 50 cents per ton on Pennsylvania anthracite, effective January 9.

Petroleum — RPS 88, Amendment 56: Establishes specific dealer and commercial consumer gasoline prices at several points in Iowa, Illinois, Ohio, Wisconsin, Arkansas, New Mexico, North Dakota, Montana, Oklahoma, and Wyoming; permits 1.5-cent increase to dealers at Quincy, Ill., effective January 9.

Petroleum — RPS 88, Amendment 57: Redefines distillates and residual oils subject to price increases, adds several Atlantic and Gulf Coast ports to list of specific prices on Bunker C and No. 6 fuel oils, effective January 9.

Petroleum — RPS 88, Amendment 58: Fixes specific prices for kerosene and No. 1 fuel oil, at various stages of marketing, in New York City, effective January 4.

Steel—RPS 49, Amendment 10: Sets seller's maximum base prices on sales out of warehouse stock in less-than-carload quantities; establishes maximum quantity extras and deductions, effective January 11.

Executive Orders

Transportation—EO 9294: Expands authority of the ODT over all domestic transportation facilities, effective January 4.

O'Mahoney Presses for Exploration Subsidy

WASHINGTON, D. C.—A recommendation that the government set up immediately a program for financing exploratory drilling for oil was made January 11 to the Reconstruction Finance Corp., the Petroleum Administration for War, and the War Production Board by Sen. Joseph C. O'Mahoney of Wyoming.

In similar letters to the heads of the three agencies, Senator O'Mahoney called attention to a recommendation for such financing made October 22 in the report of the Senate committee on public lands following an investigation which he headed. This committee asked for long-term loans of at least 5 years on good oil-land security, particularly to independent wildcatters otherwise unable to finance drilling. The senator asked the three agencies to work out a joint financing program as soon as possible.

Gulf Coast Companies Warned to Obey ODT Rules

HOUSTON, Tex.—Among subjects discussed here January 8 at a meeting of the Joint Information Office of this city, center of Gulf Coast oil activities, was that of the extent to which the oil industry has been cooperating in one phase of the effort to conserve tires and motor equipment. Under regulations imposed by the Office of Defense Transportation every driver of an empty truck must register at the Joint Information Office before going outside of the city. At that office he must obtain clearance, or if there is material to be delivered at some point on his projected trip, he must take it on. Failure to register is regarded as evidence of indifference. Violations of ODT regulations invite heavy fines.

B. Frank Johnson, manager of the Joint Information Office, said that although there had been daily use of the office by truck owners since he assumed the post last November 2, oil companies were not among them.

Kerosene Shipment in Drums Studied by PIWC

WASHINGTON, D. C. — Kerosene may soon be moving to the East Coast in steel drums shipped in box cars in order to relieve a critical shortage of this product in New England, but many practical matters remain to be worked out.

A special committee on this subject was appointed by the Petroleum Industry War Council at its meeting last week headed by John A. Brown, president of Socony-Vacuum Oil Co., Inc. The transportation and marketing chairmen of the industry committees of Districts 1 and 2, and the transportation and refining chairmen of District 3 are members.

The council was informed that the Army will sell up to 200,000 used and new 55-gal. drums and that the War Production Board is prepared to make available sufficient steel to make upwards of a million additional drums.

Patent System in Jeopardy

Dr. Wilson was formerly director of research at the Massachusetts Institute of Technology, research director in the Chemical Warfare Service, and research director of and later in charge of development and patents for the Standard Oil Co. of Indiana.

He is the inventor or coinventor of 90 patents in a variety of fields. His research studies have dealt with the flow of fluid, oiliness, corrosion, motor-fuel volatility, cracking, and many other oil-refining processes. His industrial contributions have been mainly in the fields of petroleum cracking, lubrication, and adaptation of chemical-engineering principles to the oil industry.

NEW YORK. — Reversion to the "dark ages of secret processes" will be the inescapable outcome of emasculating our patent system to deprive inventors of adequate reward for disclosure of their discoveries, Dr. Robert E. Wilson, president of the Pan American Petroleum & Transport Co., New York, declared here January 8 in an address on "Research and Patents" following the presentation to him of the 1943 Perkin Medal of the American section of the Society of Chemical Industry.

The medal was awarded to Dr. Wilson for outstanding industrial research studies at a joint meeting of the society, the New York section of the American Chemical Society, the American Institute of Chemical Engineers, the Electrochemical Society and the Societe de Chimie Industrielle.

"Our patent system is in real jeopardy," warned Dr. Wilson. "This jeopardy is due to public misunderstanding which in turn is largely due to deliberate misrepresentations as to the nature of the patent monopoly and the part which patents play in encouraging invention and the prompt disclosure of discoveries and inventions to the public. The inevitable alternative of secrecy would tremendously retard the progress of both science and industry in this country.

Scientists Urged to Resist

"It is high time for scientists to join the patent bar and trade organizations which have heretofore borne the brunt of combating the threat to our patent system which jeopardizes the whole future of industrial research. Unless our scientists help to educate the lay public, as to the facts of the situation, ill-considered legislation may be adopted which would hamper all research, prevent the prompt and free exchange of information, destroy the market of the independent inventor, and discourage the continuation of American industrial research, of which we are so justly proud.

"Probably the most serious effect that emasculation of our patent system would have on the future of research would be to encourage the use of secret processes. This would be highly unfortunate, since one of the principal reasons for the rapid advance of science and technology in the past 30 years has been the practical elimination of the secret process in favor of full disclosure and patenting as the preferable method of protecting one's rights and interests in his invention.

"If we take away a large part of the reward for disclosure, the tendency to revert to the dark ages of secret processes will be inescapable. The loss to our country would not be merely that due to the absence of competitive use of the process but even more in the slowing down of the exchange of basic information and new ideas.

"Intercompany research conferences and reports on new lines of developments would practically cease and early publication of research work would seldom be permitted. Industrial espionage would rear its ugly head, and efforts to prevent it would force the elimination of the 'open door' policy of most of our industrial laboratories.

"Even though the attempt at secrecy might usually fail within a few years, the cumulative effect of the loss of time between successive improvements would tremendously retard our progress. Under present conditions new discoveries are frequently published long before the patent is actually issued, and the effect on the whole tempo of industrial progress is tremendous because so little time elapses between the discovery and the general availability of the information to stimulate new researches in a variety of fields not originally dreamed of by the original discoverer.

"We must also not overlook the effect of a drastic weakening of our patent system on our future ability to get information from abroad. Manufacturing conditions abroad are usually better adapted to protecting the secrecy of processes than in this country, and it is only the liberality of our patent system and the existence of a real market for worthwhile patents which has led most foreign patentees to make early application for a patent in this country.

"No country has, or can expect to have, anything like a monopoly on brains, and anything which will discourage our receiving prompt information regarding new foreign developments would be another serious bar to industrial and scientific progress."

While holding the patent system to be basically sound and vital to the future of research, Dr. Wilson pointed to the need of revision from time to time to meet changing conditions and avoid possible abuses.

Limited Tenure Favored

A suggestion of merit, Dr. Wilson said, is to keep the life of the patent at not more than 17 years but also to limit the expiration date to not more than 20 years after the filing of the application. This limitation, he pointed out, would end the abuse of prolonging the period of argument in the Patent Office, so that a new patent is not issued until many years after application, in order to get the benefit of a later effective period of life.

Proposals relative to compulsory licensing and the prohibition of restrictions in licenses would dangerously affect the goals of the patent system, Dr. Wilson argued. "The greatest objection to compulsory licensing in normal times," he said, "is that it largely cancels the very reward the inventor was supposed to receive. It also interferes with the incentive of the patent owner or licensee to make a large investment in a new development if he is faced with the possibility that he may at any time be forced to give a competitor a license on terms which are unpredictable.

"Compulsory licensing necessarily would militate most seriously against individuals and smaller companies for the reason that they would find it difficult if not impossible to secure financing to develop and exploit their patented development if they knew that the large companies could, if the development were successful, acquire rights by the compulsory licensing route. Venture capital cannot

be attracted into new and hazardous fields without the prospect of unusual returns which compulsory licensing would prevent. The situation thus created would result in there being little, if any, incentive to the creation of new developments by the great mass of individuals and the large number of small firms.

"The net effect of drastic provisions against restrictions in licenses is quite likely to be the opposite of that intended. While the granting of a patent monopoly seems virtually essential to afford an adequate incentive for research and invention which is every year becoming more expensive and difficult, it is nevertheless equally true that once the invention has been disclosed and the patent granted it is thereafter in the public interest, and usually in the inventor's interest, to have licenses granted on reasonable terms to as many people as can make effective use of the invention.

"Any license, however restricted, is in essence a voluntary concession of part of the owner's rights under his original patent monopoly. In disposing of part of his monopoly the patent owner naturally must make it clear just what he is giving away and what he is retaining for himself, but such limitations in licenses have recently been under heavy attack as though they were fundamentally undesirable, and legislation forbidding almost any such limitations has been proposed.

"Using an analogy from the ownership of land, if we pass a law saying that all grants of rights-of-way must be unrestricted and without any limitations, it is certain that the landowner will be much less willing to grant rights-of-way, or if he does he will charge much more for them. Exactly these considerations apply in the case of many of the proposed prohibitions against restrictions in licenses. It should be made as easy as possible for a man gradually to chip away his monopoly, however small the individual pieces."

Smaller Companies Would Suffer

Drastic changes of the patent system would in the long run weaken the competitive position of the smaller companies, according to Dr. Wilson. "Emasculation of our patent system is bound to discourage much industrial research, which has grown so amazingly in recent years until it employed 70,000 workers in 1940," he added. "However, the effect on the amount of research done would vary greatly with the industry, and particularly with the size of the company, and in a direction which would seem to be socially undesirable.

"A drastic weakening of our patent system will least affect the research policies of the larger companies. These companies can afford to carry on research programs covering all their principal fields of activity solely for the purpose of maintaining their competitive position and keep down their manufacturing costs. Obviously, if they find it expedient not to depend on patents, such companies will not stop their research but will tend to keep their know-how largely to themselves.

"The effect on the research activities of medium size and small companies would undoubtedly be much more severe. Many small laboratories have more than financed all their research activities by one or two important inventions. Also when they come to the point of needing to undertake large scale development, which in the petroleum industry, for example, frequently cost several hundred thousand or even a few million dollars, such companies can usually, by virtue of their patent protection, interest other companies to joint with them in sharing such development costs.

"Also, without our patent and licensing system the larger companies which usually develop most of the major new processes would not be giving out information and trying to sell licenses to the smaller companies and hence the latter would not be able to promptly study the application of these processes to their own needs, and the whole process of development in industry would be greatly slowed own.

"In spite of recent attempts to arouse opposition to crosslicensing arrangements by labeling them 'patent pools' without any real attempt to study their provisions, it seems clear that the ordinary crosslicensing arrangement between companies actively engaged in research is very much in the public interest, since it facilitates and stimulates research, removes obstacles to prompt commercial development and avoids wasteful litigation. The free and prompt exchange of ideas and information between rival laboratories is a tremendous stimulus and accelerator of new developments.

"The experience of this country during the past 150 years has demonstrated that the American patent system has been an outstanding success. It has stimulated and supported the natural inventive genius of our people and has resulted in technical and industrial developments which have made us the envy of all other nations."

Effect on Universities, Laboratories

Elimination of a growing source of income to university and foundation laboratories would result if the value of patents were to be greatly reduced, Dr. Wilson declared.

"A generation ago most research workers in the medical field and many of those in our universities felt that it was not quite ethical to patent their discoveries, particularly in fields relating to public health," he explained.

"During the past 20 years, however, there has been a growing recognition of these facts: first, that failure to patent is more likely to delay than to encourage the development and marketing of new products, especially if any substantial investment or advertising is required to get them started.

"Secondly, failure to patent leaves new remedies open to widespread abuse by unethical manufacturers and promoters, whereas patenting permits a control of quality and marketing practices which is highly desirable in the case of many new drugs.

"In the third place, failure to patent simply throws away a large potential income from those who benefit from new discoveries, which income might better be collected and used to promote further research in related fields. Better appreciation of these three facts has largely changed the attitude toward patents of the workers in these fields, so that patenting is now the usual practice.

"Starting with the outstanding example of the Wisconsin Alumni Research Foundation, millions of dollars a year are today being devoted to pure research in medical and other lines from royalties obtained from the inventions of earlier workers, generally in the same organizations. This is certainly a sound and socially desirable method of financing research work which would also be lost if the values of patents were to be greatly reduced."

INDEX FOR 1942 READY

The complete editorial index of The Oil and Gas Journal for 1942 will be off the presses this month but, deviating from previous custom, it will not be incorporated in a regular issue. The 1942 index, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

Stanolind Purchases Slaughter Production

FORT WORTH, Tex.—Earl J. Fain, Jr., of Dallas, and Roy Riner of Wichita Falls, Tex., last week sold six wells in the northern part of the Slaughter pool in Hockley County to the Stanolind Oil & Gas Co. Consideration was not announced. One lease consists of 81.87 acres with three wells and the other of 119.9 acres with three wells.

OPA Bans Eastern Pleasure Driving, Cuts Fuel Coupons

WASHINGTON, D. C.—Drastic steps were taken by the Office of Price Administration last week to curtail the consumption of petroleum products in the 17 Atlantic Coast states.

Effective at noon, January 7, all pleasure driving was banned and OPA officials and local police were instructed to report cases of suspected pleasure driving to local boards. The burden of proof was placed on motorists to show that their cars were not used for purposes defined as pleasure in the regulations. The value of ration coupons was not reduced, but the prohibition against pleasure driving applies to holders of all types of coupons.

OPA also reduced by 25 per cent the value of all fuel-oil coupons used for heating buildings other than dwellings during the No. 3 heating period. Holders of ration books were required to turn them in to local ration boards for removal of coupons. Special provisions will be made for such buildings as hospitals, and war plants as require the maintenance of certain temperatures.

Meanwhile the confusion which arose from the issuance of Petroleum Administrative Order 1 which some interpreted as a priority-system control over the distribution of gasoline and fuel oil, was temporarily ended by revocation of the controversial regulation.

PAW, in revoking Order 1, announced that a new regulation is being prepared jointly with WPB in the form of an amendment, the chief effect of which will be to eliminate Schedule B. Consequently, until the new priority list is issued, only government agencies will enjoy preferential deliveries.

The amended order, it was understood, will impose an inventory limitation, preventing the delivery of gasoline or fuel oil to any person with 10 days' supply on hand, except government agencies, refineries, bulk plants, service stations and homeowners. Deliveries may be completed under terms of the order now in preparation even though this results in more than 10 days' inventory, if this will produce economies in transportation.

The new order will also amend several other sections, including clarification of the definitions on quotas and of secondary suppliers.

Confusion over distribution of limited supplies of fuel oil was heightened when OPA issued a regulation requiring every fuel-oil dealer to honor ration coupons without favoritism among customers, except where local shortages require application of quota limitations on primary suppliers set forth in the original Petroleum Administrative Order 1.

Officials stated that this did not conflict with Order 1, but distributors were even more confused by it. Order 1 required primary suppliers to give preference to essential users, and a long list of such was set out in Interpretation 1. This list included so many types of users that dealers and local officials asked for an amendment giving preference ratings among them. PAW attempted to draw a second list which would list those not entitled to fuel oil in cases of local shortages, but the matter of oil priorities was then taken over by the War Production Board.

WPB officials contended that it is the only agency empowered to allocate scarce materials among preferred users, and that WPB rather than either OPA or PAW should handle fuel-oil distribution if priorities are needed to supplement the OPA rationing system.

Gallagher and Holman Promoted To High Executive Positions

NEW YORK.—Ralph W. Gallagher last week was elected president and chief executive officer of the Standard Oil Co. (New Jersey) to fill the vacancy created by the death of W. S. Farish on November 29, 1942.

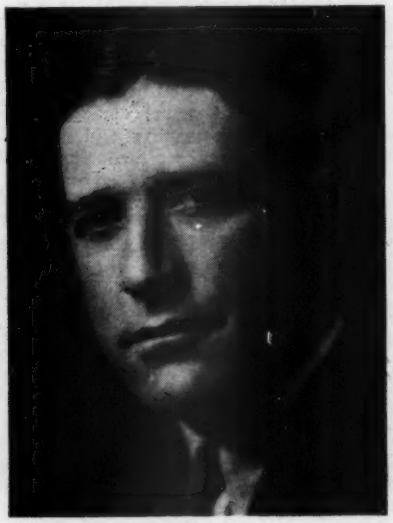
Eugene Holman, vice president and director, was elected a member of the executive committee.

Mr. Gallagher was president of the East Ohio Gas Co. when he was elected to the board of Standard of New Jersey in 1933. He became a vice president in 1937, and last November succeeded W. C. Teagle as chairman.

Born in Salamanca, N. Y., in 1881, Mr. Gallagher was forced by his father's illness to leave high school at the age of 16 to take a job with the New York Transit Co. In 1900 he went to Akron as shop foreman for the East Ohio Gas Co.

Mr. Holman, born in San Angelo, Tex., in 1895, specialized in geology at the University of Texas. He served in the U. S. Army in World War 1 and took a job with the Humble Oil & Refining Co. in 1919 upon his return from France. In 1923 he was made superintendent of the North Louisiana and Arkansas division of Humble, and 2 years later was advanced to the post of chief geologist. He came to New York in 1929 as assistant to E. J. Sadler, vice president, later serving as president of the Creole Petroleum Corp. and Lago Petroleum Corp., Venezuelan affiliates. He was elected to the board of the company in 1940 and became a vice president last November.

RALPH W. GALLAGHER



EUGENE HOLMAN

Degasification of Coal Could Open Huge Supply

SOME 500,000,000 cu. ft. of natural gas is being daily wasted in eastern coal mining fields. Such is the case, according to Leo Ranney, president of the Ranney Oil Mining Co., of Columbus, Ohio, who, in an article on the "Degasification of Coal Seams—at a Profit," in the January issue of Mining and Metallurgy, monthly magazine of the American Institute of Mining and Metallurgical Engineers, declares that new developments in horizontal drilling may make it profitable to tap trillions of cubic feet of methane gas now absorbed in unmined coal.

"This natural gas," says he, "is the deadly firedamp of the coal mines, with a heat value of 1,000 B.t.u.'s per cubic foot. Some of our mines pour out 3,000,000 to 5,000,000 cu. ft. of methane daily, and on days of low barometer one mine delivers to the surface 8,000,000 cu. ft. per day, worth some $900. In one case 27 tons of air must be circulated through the mine for each ton of coal produced."

Coal-Seam Production

"Many gas wells have been drilled into the Pittsburgh coal seam in southwestern Pennsylvania," continues Mr. Ranney. Also he tells of farmers in southeastern Ohio drilling wells into coal seams to provide a source of domestic gas. "Many of the holes," he says, "had an initial capacity of 50,000 cu. ft. of methane per day."

In explaining the process by which these vast gas reservoirs can be tapped, Mr. Ranney says, "It is common knowledge that a vacuum applied in gas and oil wells may often be observed in selected holes several hundred, or even a few thousand, feet away. Coal seams vary a great deal laterally in texture and permeability, tight streaks alternating with porous streaks or feeders, so any vertical well therein may be good or poor. The main problem then is to penetrate these permeable streaks and bleeders, and to distribute a vacuum to many of them with each hole drilled.

"Distribution of the vacuum to the flow channels has at last been solved," he continues, "by our ability to drill horizontal holes 3,000, 4,000 or 5,000 ft. long and to control the elevation of the hole at any depth, to follow the contour of the coal seam. Such holes may be drilled radially from shafts, like spokes of a wheel, or parallel to each other from mine workings (tunnels) out into virgin coal, the holes in the latter case being spaced about 800 ft. apart." These holes, according to Mr. Ranney, are cased with pipe for the first 400 ft., and then drilled and left uncased for as much as 5,000 ft. back into the coal seam. A vacuum is then applied to the cased end of the horizontal hole, which draws off the gas. By this means the unmined coal is degasified, and the hazard of explosion is reduced to practically zero, and the mine owner has all the stored gas to sell or use.

Mr. Ranney states that the over-all cost of producing gas from these horizontal wells in gassy seams is estimated at 5 cents or less per 1,000 cu. ft. The selling price," he says, "would vary from 12 to 25 cents a thousand, depending upon the customer and the location. A recovery of 50,000,000 cu. ft. should more than liquidate the cost of each well, and the operating cost from then on should be about 2.5 cents per 1,000 cu. ft.

"In ordinary mining and marketing operations," he explains, "the gas is gone long before the coal reaches the furnaces; so removal of methane from coal in place (that is, in the mine) has no effect on market values. In average coal it may be assumed that a vacuum will recover 75 to 90 per cent of the sorbed gas so degasification becomes directly profitable.

"It is my belief," he concludes, "that a daily gas supply greater than could be delivered by a 24-in. pipe line can be obtained from the eastern coal fields by this method, at a fraction of the initial cost of a long pipe line and one-fourth of the operating cost of such a line. Moreover a considerable quantity of this gas could be made available within a few months."

Refinery-Conversion Plans Explained

(Continued from Page 15)

committee had created a technical advisory committee composed of the most eminent and active technologists in the petroleum refining industry. The technical advisory committee working in close cooperation with Mr. Gary and his staff created a large number of technical subcommittees throughout the country. Mr. Gary and members of his staff toured the various refining areas of the country in company with representatives of industry's technical committees to arouse interest in the possibility of such conversions and to inform refiners large and small of the need for butadiene and the possibility of converting their equipment in such a way as to produce it quickly.

"So far as a desire to build refinery conversion projects was concerned we found that the oil companies almost unanimously regarded improvised plants of this sort as undesirable from the standpoint of the individual companies concerned. There was no tendency on the part of the larger oil companies to seek plants of this type. On the contrary these makeshift plants were regarded as a necessary evil.

"Nevertheless the petroleum refining industry made an immediate response to the urge for butadiene from converted cracking units and as of July 29, 1942, we were able to submit to Rubber Reserve and to others in authority in the rubber program a list of potential conversions each of which would use only a relatively small amount of construction material. These listed were capable of producing a total of 346,500 tons per year of butadiene.

Conversion Selling Efforts

"In July 1942, Mr. Gary and members of his staff and members of the technical committee made another tour of the refining areas to stimulate the proper development of proposals for butadiene and during this tour the Houdry process as well as the thermal process was emphasized. As the result of further work, we were able on August 14, 1942, to submit to Rubber Reserve and others in authority in the rubber program a new and more select list of potential refinery conversions capable of producing 296,700 tons per year of butadiene. Still later, viz., September 2, 1942, a list was prepared and distributed showing projects totaling 399,000 tons per year. It will be understood that these lists are not additive. The tonnage producible and the projects themselves varied as new light was brought to bear on the situation.

"The production of butadiene is only the first step in the production of buna rubber. Butadiene once produced in satisfactory purity for the production of rubber is a volatile, unstable compound which is very difficult to move from one place to another. Such transportation requires the utmost care from the standpoint of avoiding contamination or deterioration of the product and requires the use of specially built pressure type tank cars. Butadiene must be conveyed to a copolymerization plant and there reacted with styrene to produce buna rubber. I mention this to illustrate the fact that the mere availability of butadiene at any point in the United States is not the whole solution to the synthetic-rubber problem. Consequently, when we

developed the possibility of producing a large amount of butadiene by the conversion of existing refining equipment either through the thermal route or the Houdry route, it would be necessary in order to adopt the scheme in its entirety to locate polymerization plants at or fairly adjacent to each of the butadiene plants or, alternatively, to engage in a difficult transportation problem which would in itself require the expenditure of very considerable amounts of critical-construction materials.

"During the period May to August 1942, those in authority in the rubber program had driven ahead with plans for the location of polymerization plants at certain points in the country. Designs had been made, land had been purchased and considerable amounts of fabricated material had been ordered. Those in authority were loath to change their plans and to split up a few large polymerization units into a number of small ones in order to accommodate butadiene which could be produced at the various points in the country. Further, considerable progress had been made in building or preparing to build the so-called 'regular butadiene plants.' Immediate adoption of the proposals which we submitted for the production of butadiene by the conversion of existing refineries was resisted on another ground, namely, that we had not absolutely proven that the conversions could be accomplished with the use of—say—only 20 per cent of new critical construction material and had not been able to provide complete bills of materials on projects which had not yet been engineered.

Supply Difficulty Anticipated

"Anticipating this difficulty, the petroleum industry worked out lists of spare parts and second-hand equipment which would be available for such refinery conversion. Discussing this situation in several increments it may be said as a generality that it would be fairly easy to convert enough refineries to produce—say—100,000 tons a year of butadiene from existing second-hand and spare equipment using only a small amount of new construction materials for that occasional valve, tower, compressor or instrument that could not be located anywhere else. However, in expanding production from 100,000 tons to 200,000 tons, we would have exhausted a part of the second-hand and spare equipment so that to accomplish the second 100,000 tons, it would take a larger proportion of new material although still a very small quantity of material compared to that already available in the refineries to be converted. Going from 200,000 tons to 400,000 tons of butadiene would require a still greater percentage (although still a minority) of new equipment.

"For a time the merits of the refinery conversion program were pretty well bogged down in arguments as to just what percentage of new equipment would be necessary to accomplish the result. That delay was unfortunate, because it was obvious then just as it is now that whatever amount of new construction material would be required would still be less than that required to build a new plant.

"We made our first recommendation for a refinery conversion project to produce butadiene on July 20, 1942. This was the Atlas project, which was adopted by Rubber Reserve as a part of its permanent program. On August 7, 1942, we recommend the Humble quick butadiene project but numerous delays and discussions impeded its progress and it was not until November 3, 1942, that a letter of intent on a revised project was issued to permit it to go ahead.

"After the technologists of the Baruch committee investigated the refinery conversion program, they told us they were convinced by the data we had submitted that it would be feasible to produce somewhere between 200,000 and 400,000 tons per year of butadiene by refinery conversion but after weighing all factors in the rubber program, the Baruch committee recommended that the program proceed as previously planned, including three refinery conversion projects and that in addition thereto 100,000 tons per year of butadiene be provided by refinery-conversion methods. This decision was disappointing to some units of the petroleum refining industry who were anxious to proceed with plans which were well laid by that time. We have no doubt and had no doubt as to the operability of so-called permanent butadiene plants using the more satisfactory processes, which plants form the backbone of the official program. Actually as the result of further changes in the situation necessary in our opinion and concurred in by us, there will be appreciably more than the recommended 100,000 tons per year of butadiene produced by refinery conversion. The exact figure is 125,000 tons per year for those projects which have been definitely authorized to go forward, over and above the three refinery conversion projects included in the Baruch report."

PAW Assigned Authority Over Entire Series of M-68 Orders

ADDITIONAL authority was delegated last week to the Petroleum Administration for War in the gradual transfer of power from the War Production Board, a step for which the industry has long campaigned and one that now appears headed for fruition.

Latest action in this transfer was WPB's delegation of authority to PAW to amend or revoke petroleum conservation orders of the M-68 series, including the basic regulation on the spacing of wells and upon which rests most of the other Washington directives. The principal purpose of the delegation is to make it possible for the petroleum administrator to supersede the M-68 orders by Petroleum Administrative Orders.

Indication that the PAW will perfect the machinery for direct administration of orders regulating the use of materials by February 1 was given last week. This hint was contained in extension of Conservation Order M-68-5, granting certain spacing exceptions in Illinois, Indiana and Kentucky, until February 1, although it was renewed as Petroleum Administrative Order 2. The logical conclusion was advanced by oil men that PAW would have issued Order 2 for a longer period, except for the probability that a general revision is under consideration for all M-68 orders.

How Authority Is Conveyed

Authority to amend, revoke or revise the M-68 series was granted PAW by WPB amendment of the original order which was reissued in substantially its December form as of January 4. The original order expired of its own terms on December 31. Language of the order delegating administrative authority to PAW reads:

"K. Administration of order. The petroleum administrator for war or the deputy petroleum administrator for war may extend, amend, modify or revoke Conservation Order M-68 (S 1047.1), Supplementary Order M-68-1 (S 1047.6), Supplementary Order M-68-2 (S 1047.7), Supplementary Order M-68-3 (S 1047.8), Supplementary Order M-68-4 (S 1047.9), Supplementary Order M-68-5 (S 1047.10) and Supplementary Order M-68-6 (S 1047.11), as such orders may have been amended from time to time; and may take such measures with respect to any exception to any such order as he may deem necessary or appropriate; and may take such measures as he may deem necessary or appropriate with respect to any

violation accrued or incurred under any such order."

Delegation of certain WPB powers to the PAW along with elevation of the oil administration to the status of a claimant agency (officially announced last week by the Office of War Information but reported in The Oil and Gas Journal December 17, 1942) all combine into a more precise pattern for future operations. The machinery is being set up in such a way that only the petroleum administrator and the requirements committee under the Controlled Materials Plan can be responsible for failure to make the necessary equipment available for increased production. Narrowing the number of agencies through which the industry must negotiate its equipment requirements is expected to facilitate acquisition of supplies and possibly reflect in the expansion of drilling which most observers feel will be needed to meet demands for crude oil later this year.

DEATHS

Alfred Heusel, 72, one-time assistant superintendent and general manager of K-T Oil Co., Wichita, Kans., died last week at his home in Wichita. Mr. Heusel at other times was employed by Cudahy Oil Co. and Sunflower State Oil Co. He had lived a life of retirement for several years. He is survived by his widow and a son.

A. E. Masterson, 42, independent oil operator, died in a Houston, Tex., hospital last week. He had lived in Corpus Christi, Tex., for 11 years and prior to that was a resident of Angleton, Tex. A son and a daughter survive.

Hugh T. Birch, 94, one-time general counsel for Standard Oil Co., died last week at Fort Lauderdale, Fla. Mr. Birch last year gave the state a million-dollar ocean-front site for a park.

Samuel P. Williams, 50, farm manager for L. O. McMillan Oil Co. interests, died last week of a heart attack in Kilgore, Tex.

Robert McCasland, employe of Gibbons & Heasley, Inc., Midland, Tex., died in a Midland hospital from burns received in an explosion on an oil lease in the Abell field, Pecos County, Texas. Three others were injured in the same accident.

Oliver B. Stockford, one of the last of the Alberta, Canada, oil men who participated in the Calgary boom of 1914, died at Cargary recently.

William Byron Moodie, flying officer reported missing after an air raid over Stuttgart, Germany, last spring, has been officially reported dead. A son of J. F. M. Moodie, of Calgary, he worked on the Sentinel oil well east of Turner Valley, and was engaged with the Geological Survey of Canada before enlisting in the air service.

Thomas L. Blair, 76, former mayor of Oil City, Pa., and retired member of the board of directors of National Transit Co., of Oil City, died suddenly as he was backing a car out of the garage of his stepson. He had been suffering from a heart ailment for some time. Mr. Blair entered the service of National Transit in 1896 and was retired by the company in 1931. His widow, a son and a daughter survive.

John F. Penrose, 75, retired oil operator, and one of the organizers and president of National Oil Co., with principal holdings in Mexico, died in Philadelphia, Pa., January 4. Mr. Penrose lived in Mexico for a number of years. His widow, three daughters and two sons survive.

Philip Calvin Cezeaux, 60, an oil operator in the Humble field of Texas, died at a hospital in Houston, Tex., last week. In addition to his oil activities, Mr. Cezeaux was a merchant in Humble, Tex., where he made his home. He is survived by his widow, five sons and a daughter.

Joe Cooper, 42, oil operator of Ryan, Okla., died last week, an hour after he was stricken while visiting oil properties near Ryan. His wife and a son survive.

Floyd John Welch, 50, of Carter Oil Co. at Great Bend, Kans., died in a Great Bend hospital last week of coronary thrombosis. Many of Mr. Welch's years in the oil industry had been spent in South America, where he was for 14 years prior to 1936 general superintendent of the development in Bolivia and Argentina for Standard Oil. More recently he was with Lago Petroleum Co. in Venezuela. His widow survives.

Fred S. Bates, former treasurer of Ohio Oil Co., died at his home in Haines City, Fla., last week, following an extended illness. Mr. Bates, a native Pennsylvanian, joined Ohio Oil more than 40 years ago. He has been retired for several years. Two daughters survive.

John Stanley Ross, petroleum engineer, Federal Power Commission, was killed January 1 when his automobile colloided with a Washington, D. C., street car. Prior to his F.P.C. connection, Mr. Ross had served as geologist and engineer for several oil companies and for the Bureau of Mines, as well as for Otis Pressure Control, Inc., and Works Progress Administration. He conducted investigations for the Bureau of Mines in several Oklahoma and Louisiana fields. A wife and two daughters survive.

W. R. Francisco, 53, executive vice president of Deep Rock Oil Corp., died suddenly at his desk Monday morning from a heart attack. Mr. Francisco had been in excellent health recently, and is reputed never to have lost a day from work due to illness in his 24 years with the company. He came to Tulsa in 1924 with Shaffer Oil & Refining Co.'s move here. The name of the company was changed to Deep Rock in 1928. His widow, a son and two daughters survive.

E. C. Fink, 62, president and chairman of the board of Mack Trucks, Inc., died in New York City on January 1 following a heart attack suffered a few days earlier. He had been an officer of the company since its organization in 1911 and served as chief executive officer since January 1937.

John S. Cole, 56, oil-well driller, died of a heart attack while working on a drilling rig 10 miles from Bowie, Tex., last Sunday. A native of Tennessee, he had lived in Electra, Tex., for 15 years.

Pike Pledges Adjustment In Prices for Fuel Oils

WASHINGTON, D. C.—An adjustment in the prices of refinery products to encourage the production of more fuel oil will be made by the Office of Price Administration very shortly, Sumner T. Pike, head of the Fuel Price Division, told the Clark committee of the Senate investigating the midwestern fuel situation last week.

Mr. Pike said that the new schedule will seek to maintain the present over-all income of refineries but will change the differentials among various products, such as favoring kerosene over No. 2 fuel and reducing the refinery price of gasoline.

A recommendation that the refinery prices of fuel oil be increased immediately was adopted the same day by the Petroleum Industry War Council. This resolution asked the Petroleum Administration for War to work out a formula for OPA consideration which would increase the prices of residual fuel oil by 15 cents. This would be accomplished by defining No. 6 oil as residual fuel with a gravity of 10° or below and by evolving a formula of composite ceilings so that the price would vary with the amount of lighter products degraded to make heavy fuel oil.

Directional Redrilling of Piercement Type Dome to Increase Recovery

In many of the older domes depleted wells are unsurveyable for one reason or another. This article shows how these wells may be directionally drilled and put back on production.

*by J. Zaba**

DIRECTIONAL drilling may be defined as a method of oil-well drilling in which the direction of the course traversed by the well is intentionally controlled for the purpose of completing the well, at a specified depth, at a predetermined bottom-hole location.

The practical application of the method may be divided into three groups. The first group includes cases in which directional drilling is used as an emergency measure. The best example of this application is directional drilling of a relief well to control a burning or a cratered well. The second group covers application of directional drilling as a development measure. In this group would be included drilling of multiple wells from one surface location, completing of a well under an inaccessible location from a satisfactory surface location, drilling in highly faulted areas and other similar cases.

Working Over Old Properties

The third group comprises application of directional drilling for the purpose of securing additional oil recovery from apparently drilled-out properties. In this application directional drilling is used with particular success in the old piercement-type salt-dome oil fields of the Gulf Coast. Considerable additional recovery is being obtained in this area in fields which were considered as drilled out with normal development methods.

*Petroleum engineer, Rio Bravo Oil Co.

Directional redrilling of a property appears to violate the generally accepted concept of advantages of wide spacing. It should be remembered, however, that a redrilling campaign to be economically successful can be applied only in special cases and that the piercement - type - dome oil fields constitute just such a special case. The producing area of such fields is usually a narrow rim surrounding the salt mass. Steep dips, faulting and abrupt lateral changes of the lithological character of the producing formations make the location of the bottom of the well of primary importance. Conditions encountered can be illustrated by the case of a well drilled in one of these fields.

Fig. 1 shows horizontal projections of the course of three wells drilled from one surface location and their respective electrical logs. The original Well A (Fig. 1) encountered all the normal sands producing on the lease. The sands, however, were flooded with water. When the 4,500-ft. sand failed to produce on the actual test the 7-in. o.d. casing was cut under the surface casing and the second well was drilled directionally toward the dome from the depth of 1,700 ft. (Well B, Fig. 1). All the Oligocene sands were missing as shown on the electrical log. The well was carried to the total

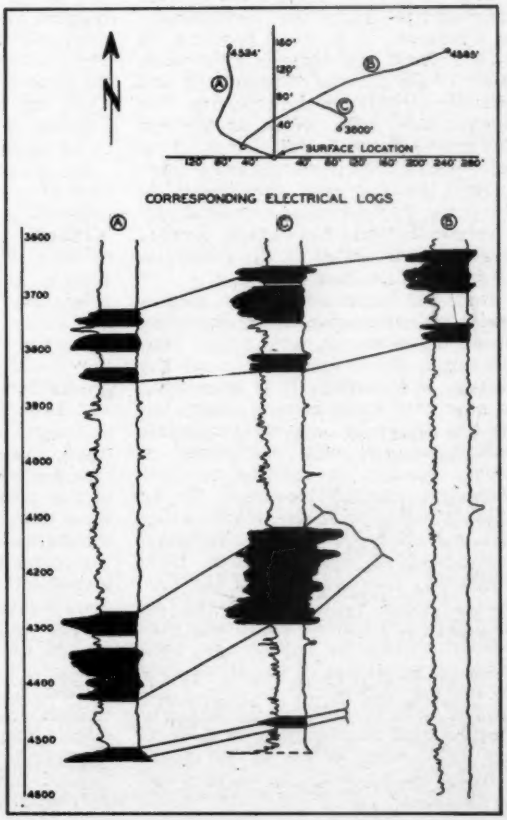


Fig. 1 — Horizontal projection of the courses of three wells drilled from one surface location

depth of 4,585 ft., was plugged back to 2,700 ft. and was directionally redrilled in such a manner as to place the completion between Wells A and B (Well C, Fig. 1). The completion in the first 20 ft. of the 4,100-ft. sand resulted in a gas well. After the well was deepened this sand proved to be a part of a 200-ft. solid sand body.

As shown in Fig. 1, the bottom of Hole B was approximately 300 ft. closer to the salt mass than that of Hole A. In other words, in a circle with a radius of 150 ft. there existed in this case three sets of conditions: (1) A number of separate sands completely flooded with water; (2) a sand body capable of producing gas and oil; (3) a complete absence of sands. If one considers that once a trend is established, even a well with a small angle of deviation can easily travel 150 ft. away from surface location, the value of knowledge of position of the bottom of a well and the ability to control its location becomes apparent. Since similarly abrupt changes can be expected in a direction parallel to the strike of formation, due to faulting and shaling out of formations, it becomes obvious that wide surface spacing cannot under such conditions utilize the producing possibilities of such a property. Consequently directional redrilling, which necessitates in many cases very close surface spacing, does follow sound engineering practices.

Study Existing Wells

The first step in a contemplated campaign of redrilling directionally an apparently drilled-out property on a Gulf Coast salt dome is a thorough study of the records of producing and abandoned wells on the property. The records are quite often incomplete and may have to be supplemented by information obtained from those thoroughly familiar with the history of the lease. In most cases a general picture can be obtained which permits drawing conclusions on the feasibility of success of such a campaign.

Once the decision is reached to proceed, the next step is recontouring producing horizons, taking into consideration the actual position of the bottom of the wells. It is interesting to note how many contour anomalies tend to disappear once contour points encountered in wells are placed in proper position in relation to their respective surface locations. To be able to accomplish the recontouring it is necessary to secure directional surveys of as many wells as it is reasonably possible. Most of the producing wells can be surveyed although in many cases the survey cannot be carried to bottom. In such cases extrapolation of the trend may be helpful. Knowledge of the tendency of drift of wells on the property may be used to advantage in correcting the contour points in old abandoned wells on which no surveys can be obtained.

In most cases a campaign of this kind starts with only meager data and subsurface locations for first wells cannot be too specific. As new wells are drilled and additional data are secured, the picture becomes more complete and it is possible to attain considerable accuracy in selecting locations for subsequent wells. All the new wells, of course, have to be surveyed while drilled, both for angle of deviation and direction of drift. The survey points should be located at sufficiently close intervals, preferably not more than 100 ft., to assure accurate and dependable surveys. Drilling operations do not have to be stopped every 100 ft. to make the survey but the survey points not more than 100 ft. apart should be available.

With information on corrected contours the location of the bottom of the well to be drilled is decided upon. This location is in form of a circle 25, 50 or 100 ft. in diameter, the degree of precision depending on the data available, within which circle the well is to be completed at a specified depth.

The surface location is then selected in such a manner as to take advantage of the natural tendency of a drilled well to drift in a certain direction. This tendency of drift may be different in different fields, or in different parts of a field. Experience gained from drilling of a number of wells usually permits placing of surface location in such a manner that the selected bottom location may be reached most economically with minimum use of directing tools. Cases will occur when a well will not follow the expected course. These cases, however, are rare enough to justify an attempt to utilize the drift normally to be expected.

In selecting the bottom-hole location of a proposed new well on an apparently drilled-out property many different applications of directional drilling will suggest themselves. In general, however, there are three considerations which should be investigated first.

First come the dry holes drilled on the property prior to development and application of directional well surveying. Because of the characteristics of salt-dome oil fields, previously outlined, namely, steep dips, narrowness of the producing area and shaling out of the formations, a dry hole of this type does not necessarily condemn its particular surface location. Should the corrected contours of a producing formation indicate possibilities of a good location the question of drilling a well even immediately adjacent to an old dry hole should be seriously considered.

Next is the question of water intrusion. Sands apparently flooded with water may still furnish excellent producers if the subsurface location of new wells is placed only a very short distance closer to the dome in relation to the bottom-hole locations of the old wells. This possibility may be exploited in two ways. First, in case of new wells, if a sand is found lower than was expected on basis of available data, the well may be redrilled directionally toward the dome and quite often completed as a satisfactory producer, furnishing also important information for selection of future locations. Second, if water production of a producing well increases to the point where further operation of the well is no longer profitable, additional recovery may be obtained by working over the well in such a manner as to place the bottom of the well closer to the dome and structurally higher.

Prematurely Abandoned Wells

The third factor to be considered is the problem of old, prematurely abandoned wells. Because of the nature of the producing formations and necessity of screening the face of the producing sand, wells in this type of fields have a higher frequency of mechanical difficulties than those in other areas. This was particularly true 10 to 15 years ago. Due to improvement in material and design of the present-day subsurface equipment, it is possible to satisfactorily operate wells which could not have been produced profitably in the past.

Furthermore, in the days before curtailment of production through proration, the ideas of what constituted an economic limit of a well were different from those now generally accepted. Because of these facts many of the old wells were abandoned prematurely, before exhausting producing possibilities in the area of their drainage. Study of the records of individual wells will suggest locations where a well can be completed as a satisfactory producer if drilled in such a manner as to place its bottom in the vicinity of the bottom of an apparently prematurely abandoned old well.

These three lines of thought which can be followed in selecting new locations are herewith illustrated with cases of directional redrilling campaigns undertaken on a producing property in one of the old, shallow-piercement-type-dome oil field of the Texas Gulf Coast. The property in question was considered as drilled out over 8 years ago. During this period a number of new wells were drilled directionally and some of the old wells were directionally worked over. Around 3,000,000 bbl. of additional recovery has to be credited to this campaign to date, with considerable reserve still to be recovered.

The fact that an old dry hole in a field of this type does not necessarily condemn its surface location can be illustrated by the case of a very good producer completed on the property in question only 50 ft. from an abandoned dry hole. The dry hole, drilled in 1923, was carried to the total depth

of 4,743 ft. without encountering any commercially productive sand. When the property was directionally redrilled the contours on top of the 4,100-ft. sand, corrected for actual locations of bottoms of other wells, indicated that the surface location of the dry hole was very satisfactory for this particular sand. Location was made for the new well 50 ft. from the dry hole and in drilling particular care was taken to finish the well in the 4,100-ft. sand as closely under the surface location as possible. The well was completed in the 4,100-ft. sand, the bottom of the hole being 34 ft. east and 4 ft. north from the surface location. The initial production of the well on 24-hour potential test on ¼-in. choke was 504 bbl. of pipeline oil. To November 1, 1942, the well made total of 136,707 bbl. and is now standing because of mechanical difficulties, but is still capable of producing. No survey of the old well is available but correlation of the electrical log of the new well with the driller's log of the old well suggests that the old one drifted a considerable distance away from the dome and missed the sands.

As previously stated recompleting a well closer to the dome to alleviate water conditions may be useful both in drilling new wells and in working over old ones. Application in case of drilling a new well is illustrated in Fig. 2, showing the case of a well projected to the 4,200-ft. sand. At the time location was drilled only meager data were available on corrected contours of this sand, consequently no attempt was made to place the bottom of the hole at any precise subsurface location. The well found the sand at 4,300-24 ft. and after making a total of only 3,340 bbl. went completely to water (Well A, Fig. 2).

After deepening failed to find any other commercially productive sand the 7-in. o.d. casing was cut under the surface pipe and the well was drilled directionally toward the dome. As shown in Fig. 2, the bottom of the second hole (Well B) from the same surface location was placed 110 ft. nearer the dome than the bottom of the first hole. The well was set in sand from 4,191 to 4,204 ft. (around 110 ft. higher than in the first hole) and came in with initial production on ¼-in. choke of 454 bbl. pipe-line oil. To November 1, 1942, the well made a total of 80,751 bbl. and is still a very good pumper. In addition information obtained through this redrilling helped in locating other good producers in the same sand.

Applications of the same technique to wells already on production, in which the percentage of water becomes too high for economical operation, are quite common. It is customary in such cases to set a whipstock in the casing 100-200 ft. above the sand. The whipstock is oriented toward the dome and the sand is usually encountered high enough to permit further profitable operation of the well.

There is, for instance, the case of a well on the property in question which produced a total of 156,747 bbl. from the Miocene sand at 3,430-94 ft. before going to water. A whipstock, oriented toward the dome, was set at 3,351 ft. The sand was topped at 3,400 ft. and was set from 3,400-30 ft. On this new setting the well has already produced 14,586 bbl. and is still on production.

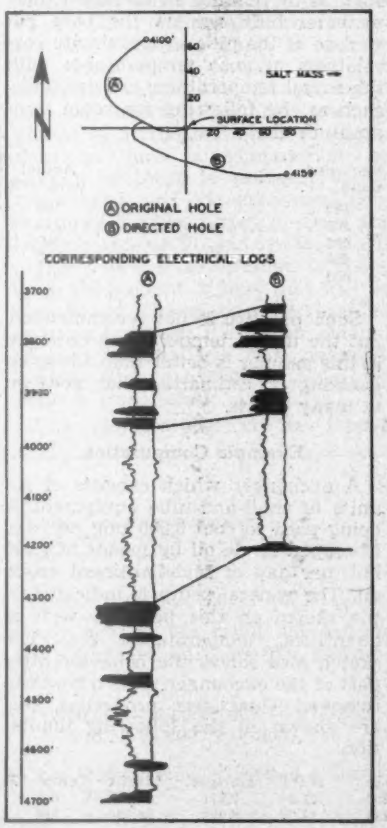
More Production Found

The problem of completing a good new well in vicinity of an old well which did not exhaust the producing possibilities of its drainage area, can be illustrated by example shown in Fig. 3.

Well A was abandoned in year 1934 after producing a total of 122,537 bbl. from the 4,400-ft. sand. Prior to abandonment the well was surveyed to a point as close to the bottom as possible. This happened to be 4,130 ft. Later, location B was drilled. Hole 1 from this surface location drifted considerable distance toward the dome, missed completely the 4,400-ft. sand and was bottomed at 4,656 ft. as a dry hole. The hole was then directionally redrilled toward the bottom of Well A. Last available survey of Hole 2 from surface location B was at 4,252 ft. From the angle of deviation of the last surveys and from the trend of drift of this well and of the old well drilled from location A it can be assumed that the bottoms of the two wells are not more than 40 ft. apart. Hole 2 of surface location B was completed in the 4,400-ft. sand with initial production on ¼-in. choke of 240 bbl. pipe-line oil produced to November 1, 1942, a total of 56,099 bbl., and is now a good pumper.

Under present wartime restrictions governing spacing of wells such a redrilling campaign, particularly in regard to drilling new wells, is not feasible. It is worthwhile, however, to note, for future consideration, that in many cases considerable additional recovery can probably be obtained from a number of apparently drilled-out piercement-type-dome oil fields of the Gulf Coast. Carefully planned procedure is an essential prerequisite if this additional recovery is to be economically profitable.

Fig. 2—Horizontal projection of two wells drilled from one surface location



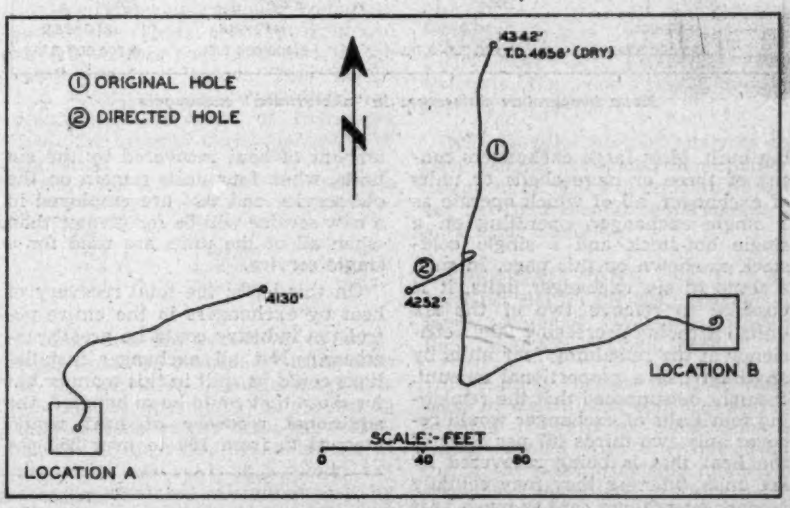


Fig. 3—Relative position of courses of two wells

How to DOUBLE Your Heat-Exchanger Surface

by W. L. Nelson

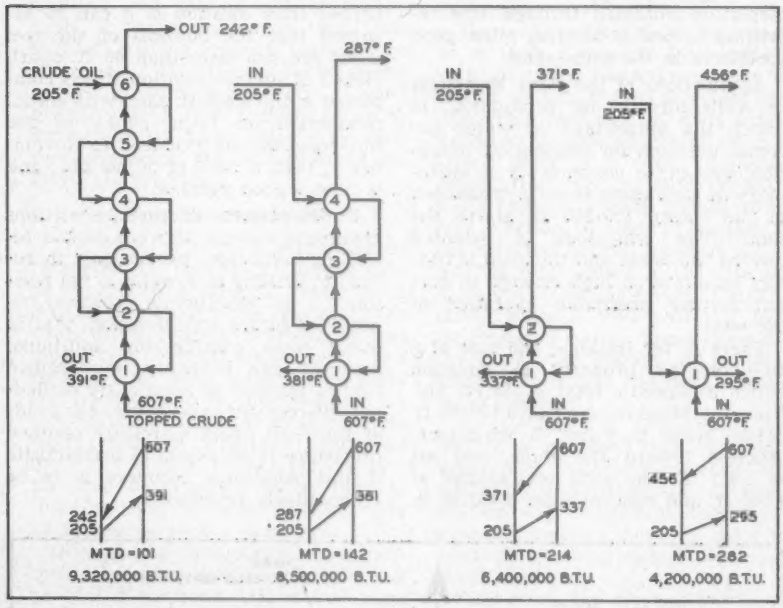
Today heat exchangers are vital to our war effort. Described here is a method by which exchangers already in service can be made to meet our needs, and at no great sacrifice in heat economy.

THE switching of equipment from one service to another is a common procedure in refineries and particularly so at the present time because of the scarcity of new equipment. This applies particularly to heat exchangers because these are now one of the most critically scarce types of equipment.

In some degree, heat-exchanger equipment can be made to go farther by using part of the exchangers now in service for new plants that are being built. Most large exchangers consist of three or more shells or units of exchanger, all of which operate as a single exchanger, operating on a single hot-stock and a single cold-stock as shown on this page. In such a setup of six exchanger units, it is possible to remove two of the six units without decreasing the efficiency of the remaining four units by anything like a proportional amount. It might be supposed that the remaining four units of exchanger would recover only two-thirds (67 per cent) of the heat that is being recovered by six units, whereas they may actually recover over 90 per cent as much heat as the six units. Finally, the total amount of heat recovered by the six units, when four units remain on the old service and two are employed in a new service will be far greater than when all of the units are used for a single service.

On this basis, the total recovery of heat by exchangers in the entire petroleum industry could be greatly increased. Not all exchanger installations could be split in this manner but for those that could be so handled, the additional recovery of heat would amount to from 100 to over 250 per cent—or stated in reverse, after such changes are made we would have the equivalent of 100 to 250 per cent more heat exchanger surface for the use of war plants. The penalty for this saving would be a decrease in thermal efficiency—and although refinery fuel is also a valuable material at this time, it is probably not as vital nor critical as our lack of exchangers.

It would not seem unreasonable to be able to steal enough exchangers from present plants to supply more than half of the exchanger surface needed for all of the war plants now under construction.



Mean temperature differences in "abbreviated" exchangers

Base Design on Present Performance

Although the performance of the abbreviated exchanger, i.e., one from which two of say six original units have been removed, can be ascertained by using transfer rates which are estimated from general formulas, tabulations, etc. (pp. 399-412, 2nd Ed., Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., New York, or other reputable sources) the most sound practice is to utilize the present performance of the exchanger. In many plants, the inlet and outlet temperatures of the fluids are not recorded and hence it will be necessary to install thermometer wells or to estimate the temperatures by other means such as by holding an insulated thermometer bulb against the bare hot surface of the pipe. Approximate correlations of such temperatures with the actual temperatures are available, such as the following for room temperature air:

Recorded temp., °F.	Actual temp., °F.
100	100
200	240
400	500
600	730
800	910

Such practice is not recommended, but the use of temperatures obtained in this manner is better than the gross guessing or estimating that goes on in many plants.

Example Computation

A exchanger which consists of six units of shell-and-tube equipment is being used to cool 3,000 bbl. per day of topped crude oil by means of 7,000 bbl. per day of Mid-Continent crude oil. The general setup is indicated in the sketch on this page, as well as quantities, temperatures, etc. The sketch also shows the behavior after part of the exchanger units have been removed. Quantities, properties, etc., are shown in the following tabulation:

	B.p.d.	G.p.h.	A.P.I.	Lb./gal.	Lb./hr.	Temp., °F.
Topped crude	3,000	5,250	21.3	7.711	40,500	607
Crude oil	7,000	12,250	38.7	6.922	84,800	205

Each of the six units of exchanger are identical and they each consist of 743 sq. ft. of surface.

The heat being transferred by the exchanger is:

$$40{,}500\ (607 - 242)\ 0.63 = 9{,}320{,}000$$

(lb.) (temp.) (sp. ht.) (B.t.u. per hr.)

and also

$$= 84{,}800\ (391 - 205)\ 0.59$$

(for crude oil)

The rate of heat transfer in an exchanger is dependent on the amount of heat transferred (9,320,000 B.t.u. per hr.), the amount of surface (6 × 743 or 4,458 sq. ft.), and the log mean temperature difference (101° F., see sketch) so that the actual transfer rate at the present time is:

$$H = \frac{9{,}320{,}000}{(101)\ (4{,}458)} \times 20.2 \text{ B.t.u./(hr.)(sq. ft.)}$$

The transfer rate will be substantially the same, after some of the units are removed and for our purpose will be considered as 20 regardless of the number of exchanger units removed. In actuality it will be somewhat higher, ranging to perhaps 23, as increasing numbers of units of exchanger are removed.

If two of the six units of exchanger are removed, the surface will obviously be less (4 × 743 or 2,972), the topped crude will not be cooled as much (nor will the crude oil be heated as much), and the total heat transferred will be less. There is no simple, direct way to compute just how much the values will change, but it can be accomplished by what is known as a trial-and error computation. In such a computation an amount of heat is assumed to be transferred, and the exchanger performance is investigated to see if the transfer rate is 20, and if the rate is not 20, another assumption is made as to the amount of heat that will be transferred. The operation is repeated as necessary until the proper amount of heat transfer has been assumed. Assume first that 7,000,000 B.t.u. per hour is transferred.

The temperatures of the topped crude and of the crude oil leaving the exchanger will, on this assumption, be:

$$7{,}000{,}000 = 40{,}500\ (607 - x)\ 0.65,$$

and $= 84{,}800\ (y - 205)\ 0.58$

x = temperature of topped crude = 341° F.

and

y = temperature of crude oil = 342° F.

The log mean temperature difference for such conditions is:

$$MTD = \frac{(607-342)\ (341-205)}{2.3 \log \frac{(607-342)}{(341-205)}} = 193$$

According to these conditions, the transfer rate would be:

$$H = \frac{7{,}000{,}000}{193 \times 2{,}915} = 12.2$$

Obviously, the assumed amount of heat transfer is too low because an exchanger which is capable of transferring heat at the rate of 20 B.t.u. per sq. ft. would, by this assumption, be asked to transfer only 12.2 B.t.u.

Assume that 8,500,000 B.t.u. per hour is transferred:

$$8{,}500{,}000 = 40{,}500\ (607-x)\ 0.655$$

$$= 84{,}800\ (y-205)\ 0.57$$

$$x = 287° \text{ F.}$$

$$y = 381° \text{ F.}$$

The temperature difference diagram for these values, and the log mean temperature difference is shown on the sketch on this page.

$$MTD = 142° \text{ F.}$$

H for this assumption =

$$\frac{8{,}500{,}000}{2{,}972 \times 142} = 20.2$$

This is a sufficiently exact check. The exchanger will transfer about 8,500,000 B.t.u. per hour if two of the six units of the exchanger are removed. Note that 91.2 per cent of the heat is being saved by using only two-thirds of the heat exchanger.

Other Situations

Similar computations were made for even more abbreviated exchanger situations. These are shown in the sketch on this page and also in the tabulation just below. This sketch and tabulation are for stealing two, four, and five units of exchanger from the original exchanger setup of six units.

	Percentage of original heat transferred	Heat lost per hr., B.t.u.	Surface saved, sq. ft.
Original six-unit exchanger	100	0	0
Using only 4 units	91.2	820,000	1,486
Using only 2 units	68.6	2,920,000	2,972
Using only 1 unit	45.0	5,120,000	3,715

Thus with this particular exchanger, it would be possible by using each of the six units in different plants (for similar operations) to recover 25 million B.t.u. rather than the 9,320,000 B.t.u. recovered when all six of the units are used as a single exchanger; or stated in another way, by operating with only one exchanger unit the efficiency of heat recovery is lowered to 45 per cent but 3,715 sq. ft. of surface can be made available for other operations or war plants.

BOOK REVIEWS

SPECIAL MINERALS BULLETIN No. 1. Department of Conservation, Louisiana Geological Survey, Baton Rouge, La. 450 pp. $1.

This bulletin consists of 43 pages devoted to nonpetroleum subjects and the remainder to oil and gas. Presented, although not referred to in the table of contents, are production of gas for recent years, with accumulated production to January 1, 1942, as well as a record of condensate and oil production by fields. Completion data are given on all wells drilled during 1940 and 1941 in Louisiana, both field wells and wildcats.

The report concludes with complete data on all fields including geology, producing sands, character of production, special orders and remarks on present status. It is the most complete resume of activity in any state that the reviewer has yet seen.

A BIBLIOGRAPHY OF OKLAHOMA OIL AND GAS POOLS. Alan G. Skelton and Martha B. Skelton. Bulletin 63. Oklahoma Geological Survey. Norman.

A partially annotated list of references from federal and state publications, scientific papers and oil-trade journals dealing with Oklahoma's oil and gas pools. Appendices present list of pools by counties and by township and range, the former list containing a number of names now discarded and the names now applied to these pools.

COMBUSTION - CHAMBER DESIGN FOR OIL ENGINES. Paul Belyavin. Sherwood Press, Cleveland, Ohio. Price $1.50.

This 88-page booklet analyzes the development of combustion-chamber design in an effort to understand better the fundamental requirements of a rational chamber.

BREAKING THE SKILLED LABOR BOTTLENECK. Eugene J. Benge. National Foremen's Institute, Inc., Deep River, Conn. $2.50.

This study brings to light many ways in which labor shortage may be avoided or overcome. Subdivision of skills, coupled with intensive training, is the most promising method of showing immediate results. This manual should prove helpful to foremen, supervisors and instructors.

JOB DESIGN—As Applied to the Pumper's Daily Routine

Part 2

by H. G. Thuesen and M. R. Lohmann**

The principles of Job Design as outlined in last week's issue of the Journal are here applied to the pumper's job and indicate saving of 55 per cent in annual cost per well.

IN last week's article, the theory of job design was discussed and a case example selected for illustrative purposes. The essentials of the pumper's job were determined and to meet these essentials, it was calculated that the pumper's job should be scheduled on the basis of six visits per well per day for least cost. The following article is a continuation of the same case example.

Performance Time of Pumping Elements

Having determined the essentials of the pumper's duties in broad general terms, the next step is to determine in detail what elements of work must be performed and the time required to accomplish them.

One of the larger elements of the pumper's duties is that of walking between leases. The time to perform this element depends on the distance walked and the rate of walking. In this case example, the average distance between wells is approximately 500 ft. A rate of walking equal to 2.75 miles per hour is used as there is a tendency to use older men as pumpers.

A. Walk Between Leases

$$500 \div \frac{2.75 \times 5280}{60} = 2.06 \text{ min.}$$

On a visit for the primary purpose of servicing and adjusting equipment, the following duties will regularly be performed: Check gages on motor, add oil and water if needed, check polished rod and count strokes, adjust engine speed if necessary, and note by feel and by opening bleeder if pump is operating properly. These duties will be accomplished by performing the elements of work listed below under groups B_1, B_2 and B_3. The time values were determined by timing large numbers of each element and are a fair value in which to do each element on the average lease.

B. Work Done on Regular Visits to Lease

1. Inspect and service lease equipment

	Min.
Open gate	0.20
Walk to engine	.35
Fill radiator	.30
Inspect motor and check gages	.50
Check oil level	.20
Walk to well	.20
Check s.p.m. and open bleeder	.50
Walk to gate	.35
Close gate	.20
Total	2.80

On a visit made primarily to determine if the equipment is operating properly and to correct or report "down" wells, the duties to be performed will be the same as the B_1 elements except that fill radiator, check oil and check s.p.m. are omitted as unnecessary. The remaining elements designated as B_2 are:

2. Inspect lease equipment

	Min.
Open gate	0.20
Walk to engine	.35
Inspect motor and gages	.50
Walk to well	.20
Check pumping action, open bleeder	.30
Walk to gate	.35
Close gate	.20
Total	2.10

When the pumper is on the lease to make either a B_1 or B_2 type visit, the tank battery may be visited. The additional work elements for average conditions are designated as B_3 and are listed below.

3. Check tank battery

	Min.
Walk from well to battery	0.25
Ascend, visual check one tank and gage one tank	1.20
Make notes and descend	.50
Check heater	.50
Check pipe-line pump	.20
Total	2.65

In addition to the regular duties, there are other duties to be performed at infrequent intervals at each well. In so far as possible, these infrequent duties should and can be performed while the pumper is on the lease during a regular visit. A partial list of these infrequent work elements are as follows:

C. Infrequent Work

Element of work—	Time required in min.	Interval in days	Time per well per day (min.)
Change stuffing box rubber	15	20	0.8
Tighten stuffing box	0.5	3	.2
Change s.p.m.	2	1	2.0
Clean engine	5	7	.7
Add oil to engine	3	3	.0
Change filter	8	20	.4
Add Tret-o-lite	3	20	.1
Lubricate pumping unit	7	14	.5
Add battery water	4	3	1.3
Lubricate engine	4	7	.6
Grind out sample	10	5	2.0
Gage and thief receiver and cellar	8	30	.2
Determine cause of trouble	15	30	.5
			10.3

A third classification of duties not necessarily performed at regular intervals but considerably longer than any element of infrequent work are the work elements, topping out tanks and witness gaging. On a per well basis, the time topping out tanks varies with the frequency of filling, time spent for topping out and extra walking required. In this case example, the time measured was as follows:

D. Topping out Tanks

1.0 minute per well per day

The time consumed in witnessing gaging is composed of two parts: (A) idle time waiting to make contact with gager and (B) time per battery converted to time per well in actually witnessing gager's measurements.

E. Witness Gaging

1. Idle time incident to making contact

15 minutes per day.

2. Witnessing measurements

3.0 min. per well per day

The conversion of the tank gage from feet and inches to barrels and

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the addition and subtraction necessary in making out the daily gage report is a formidable chore for many pumpers. Time studies show that the average pumper requires 10 to 12 minutes to make out this report while a competent clerk can easily do it in 2 minutes. Therefore, substantial economies are realized by centralizing this work under a competent clerk. It is now only necessary for the pumper to report on a new form his daily gage to his supervisor in feet and inches. The pumper occasionally makes out other minor reports and the time to do this on a per well basis is included in the figure below.

F. Reports

New gage report, plus miscellaneous infrequent reports

1.5 min. per day per well

Cleaning the lease grounds is not a large item as it requires only 2 minutes per well per day but it looms very large in the pumper's mind. For this reason and because it could be done more economically by one workman assigned full time to do all this work for the over 100 wells in the field, the pumper has been relieved of this duty.

To these work elements, there must be added an arbitrary allowance for personal needs.

G. Personal

30 min. per 8-hour tour or 90 min. per 24-hr. day.

It is very possible that occasionally several items of infrequent work will occur on one tour and a well or two may need some special attention. For these reasons, a contingency allowance of 1 hour and 30 minutes is allowed per tour. This contingency allowance is admittedly quite large. It plus the personal allowance equals 25 per cent of the pumper's working day. This contingency allowance is much greater than necessary so there can be no question with an allowance of this magnitude that the new job design is too severe even for men of advanced years, who are usually assigned to this work.

H. Contingency

Allow 1½ hours per tour or 4½ hour per day

270.0 min.

Total Time Per Well Per Day

Once the several items of work and the time to do each has been determined, the job can easily be built up to fulfill its essentials. Items A, B_1, B_2, and B_3 are measured and defined on a per well basis. Multiplying the time required to perform each item by the number of times each item is performed per day will result in the time per well per day. Items C, D, E_3 and F are already measured on a well per day basis while items E_1, G and H are measured on a per day basis.

	Min.
Item A—As determined in the previous article, six visits per day must be made to meet the essentials of job and to have least over-all cost. Thus a pumper must walk to each well six times. 6 × 2.06 =	12.36
Item B_1—This item embraces inspect and service lease equipment and requires 2.80 minutes per visit. It was previously determined that this should be done three times per 24 hours or once per tour. 3 × 2.80 =	8.40
Item B_2—This item embraces inspect lease equipment and requires 2.10 minutes per visit and is to be done three times per day or once per tour. 3 × 2.10 =	6.30
Item B_3—This item embracing check tank battery may be performed in conjunction with either B_1 or B_2 three times per day. 3 × 2.65 =	7.95
Item C—The total time for all items of infrequent work on a per well per day basis is	10.30
Item D—Topping out tanks on a per well per day basis requires	1.0
Item E_3—Witnessing measurements of the gager per well per day equals	3.0
Item F—All reports require per well per day	1.5
Total time required per well per day for all the above elements is	50.81
Item E_1—Idle time incident to making contact with gager per day	15.0
Item G—Personal allowance	90.0
Item H—Contingency	270.0
Total time required per day for the above elements is	375.0

Determination of Number of Wells Per Pumper Group

Of the 1,440 minutes in a three 8-hour tour day, subtract 375.0 minutes, the total of Items E_1, G and H above, leaving a remainder of 1,065.0 minutes per day to perform all the other elements. The total time to perform all other elements as given above is 50.81 minutes.

Therefore, the number of wells that can be handled per tour by one pumper is 1,065.0 divided by 52.01 or 20.9 wells or for practical purposes, 20 wells.

The Pumper's Schedule

Having determined the number of wells to be handled by the pumper, the next step is to work out a practical schedule for the pumper for the performance of his duties. This schedule is not a rigid one to be followed exactly by the pumper but rather is a guide of how the job can be done. For simplicity of explanation, it will be assumed that all wells in the lease group are full time wells producing between 100 and 600 bbl. per day. Theoretically, 20 wells can be handled in the one lease group when activities are properly coordinated.

8 a.m. to 4 p.m. tour

	Min.
Item A—Walk first round 20 × 2.06 =	41
Item B_1—Inspect and service lease equipment first round 20 × 2.80 =	56
Item A—Walk second round 20 × 2.06 =	41
Items B_2 and B_3—Inspect lease equipment and check tank battery (2.10 + 2.65) × 20 =	95
Item C—Infrequent work (part of)	46
Item D—Topping out tanks (one-third) 6 × 1.0	6
Item E_1—Make contact with gager	15
Item E_3—Witness measurements 20 × 3.0	60
Item G—Personal	30
Item H—Contingency	90
Total	480

4 p.m. to 12 p.m. tour

Item A—Walk first round 20 × 2.06 =	41
Item B_1—Inspect and service lease equipment first round 20 × 2.80	56
Item A—Walk second round 20 × 2.06	41
Items B_2 and B_3—Inspect lease equipment and check battery on second round (2.10 + 2.65) × 20	95
Item C—Infrequent work (part of)	120
Item D—Topping out tanks (one-third) 7 × 1.0	7
Item G—Personal	30
Item H—Contingency	90
Total	480

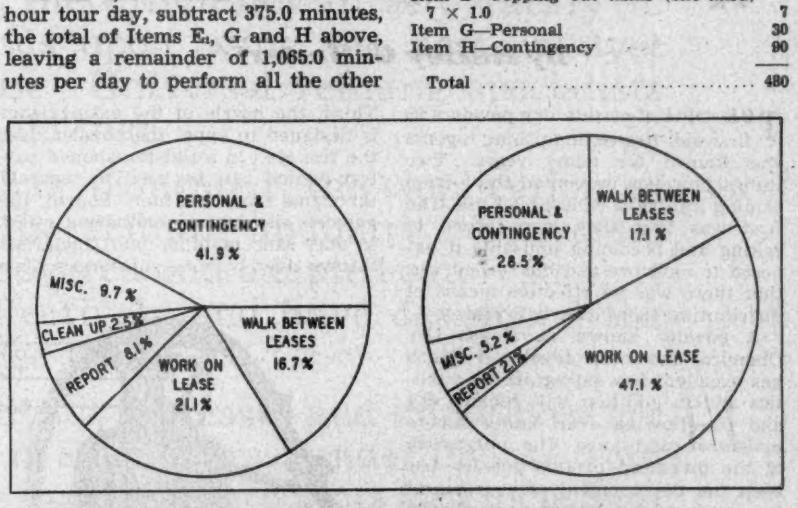

PERSONAL & CONTINGENCY 41.9 %
MISC. 9.7 %
CLEAN UP 2.5 %
REPORT 8.1 %
WORK ON LEASE 21.1 %
WALK BETWEEN LEASES 16.7 %
PERSONAL & CONTINGENCY 28.5 %
WALK BETWEEN LEASES 17.1 %
MISC. 5.2 %
REPORT 2.1 %
WORK ON LEASE 47.1 %

Fig. 1—Diagrams showing how time was spent in looking after 9 wells (left) compared with designed handling of 20 wells (right)

12 p.m. to 8 a.m. tour

Item A—Walk first round 20 × 2.06	41
Item B—Inspect and service lease equipment first round 20 × 2.80	56
Item A—Walk second round 20 × 2.06	41
Item B_2 and B_3—Inspect lease equipment and check battery on second round (2.10 + 2.65) × 20	95
Item C—Infrequent work (part of)	40
Item D—Topping out tanks (one-third) 6 × 1.0	6
Item F—Reports 20 × 1.5	30
Item G—Personal	30
Item H—Contingency	141
Total	400

The above schedule will need minor adjustments for each particular

pumper group to which it is applied to suit local conditions.

Savings

On first consideration, it may appear that the time, effort, and expense required to design jobs and work out schedules such as the above can hardly be justified. In this connection, it should be remembered that a machine is designed. No one would hesitate to approve substantial expenditures to properly design a machine that would save $40,000 annually.

In this case example, the average number of wells handled by one pumper was nine. After job design, the same pumper could handle 20 wells or an increase of 122 per cent. On a per well basis, annual pumping labor costs will drop from $700 to $315, or 55 per cent. The schedules as worked out above are applicable to the over 100 wells controlled by the operator in the field making total labor savings in excess of $40,000. In addition, job design allows an equal distribution of work on the basis of the time and effort expended by the pumper.

Savings of this proportion are not unusual as similar applications of job design in fields in other areas have shown percentage savings comparable to this case example. Where production per well is small as is the case in many fields, similar percentage increases in the number of wells handled by one pumper, even though the pumper may now be handling more wells than in this case example, is possible by the application of study and design. Job design is not limited to pumpers or pumping as successful applications have been made to well servicing, maintenance, and other production jobs.

Dry Chemical Gas-Pressure Type Fire Extinguishers

***by Harley G. Hastert** **

THE value of certain dry powders as first-aid fire-extinguishing agents was known for many years. Two things, however, prevented these from coming into very widespread use. The first was that they were prone to caking and becoming unusable if exposed to moisture and the second was that there was no effective means of distributing them over a fire area.

A powder known as Dugas Dry Chemical has been developed which has excellent fire-extinguishing qualities and in addition will remain dry and free-flowing even under severe moisture conditions. The outgrowth of the invention of this powder has been the development of a pressure-type extinguisher known as the Dugas Dry Chemical extinguisher.

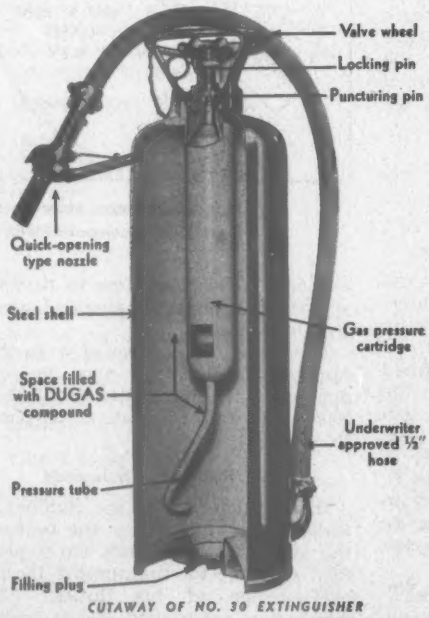
The powder from these extinguishers acts in a number of ways to extinguish flames. First, when it comes in contact with flame a chemical reaction liberates large volumes of carbon dioxide and water vapor. The volume of these gases has been calculated to be over 1,100 times the volume of the powder from which they are liberated. These gases reduce the amount of oxygen in the vicinity of the flames and thus smother the fire. Second, the chemical reaction absorbs heat, resulting in a cooling effect on the flames, further tending to stop combustion. Third, the nozzle of the extinguisher is designed to expel the powder over the fire area in a flat fan-shaped pattern which can be used to separate the flame from the fuel. Fourth, the powder also has a smothering effect as does sand or other inert materials thrown over burning substances. This effect is valuable in that it tends to prevent flashbacks in the area where the fire has already been extinguished.

None of the ingredients of this powder nor any of the gases or other decomposition products from its contact with a fire are toxic to personnel. Dugas powder is not abrasive and is not harmful to mechanical devices.

Dugas extinguishers are approved by the Underwriters' Laboratories and Factory Mutual Laboratories for fires in naphthas, gasoline, paints, oils and other inflammable liquids and the powder is also approved for fires in and around electrical equipment because it is a nonconductor of electricity.

The increased use of liquefied petroleum gases over the last decade has brought with it the need for an extinguisher particularly effective on fires in these materials. The dry-chemical gas-pressure-type extinguisher has been found, both by extensive tests and in practice to excel in handling this type of fire.

The hand-type models consist of a drawn seamless-steel tank which contains the powder, a replaceable gas-pressure cylinder located within the extinguisher, and a hose and nozzle through which the powder is expelled. The extinguisher is placed under pressure at the time of fire by puncturing a seal on the gas cylinder and the resulting flow of powder can be controlled at will by operating the spring-closing nozzle valve. The powder from the hand extinguisher is propelled a distance of over 20 ft. from the nozzle, enabling the operator to reduce the intensity of a fire from a distance and then close in for the extinguishment. The powder is expelled forcefully so that the extinguisher is effective despite winds.



CUTAWAY OF NO. 30 EXTINGUISHER

A very valuable feature of this extinguisher is the ease with which it may be promptly recharged. By having an extra supply of powder and cartridges, the extinguisher can be easily recharged and immediately returned to service. The powder does not deteriorate and the extinguisher need not be recharged until after use. No protection from freezing temperatures is required.

The wheeled units have the same desirable characteristics as the hand units though they will of course handle very much larger fires. The powder is expelled from the steel tank through the use of an external cylinder of gas. The extinguishers are equipped with 50 ft. of ¾-in. hose and are designed for the protection of hazards such as pump houses, loading racks, and similar operations where naphthas or hot oils are handled.

*Chief Engineer, Dugas Engineering Corp., Marinette, Wis.

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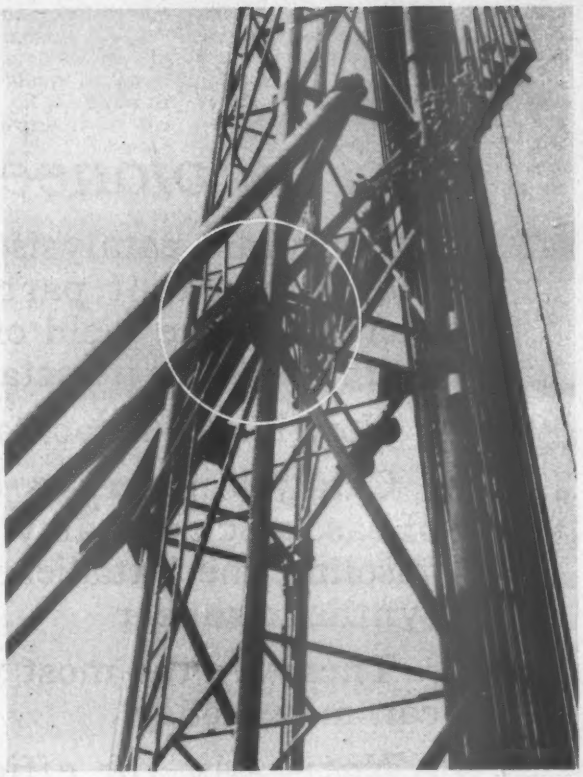
OPERATING IDEAS

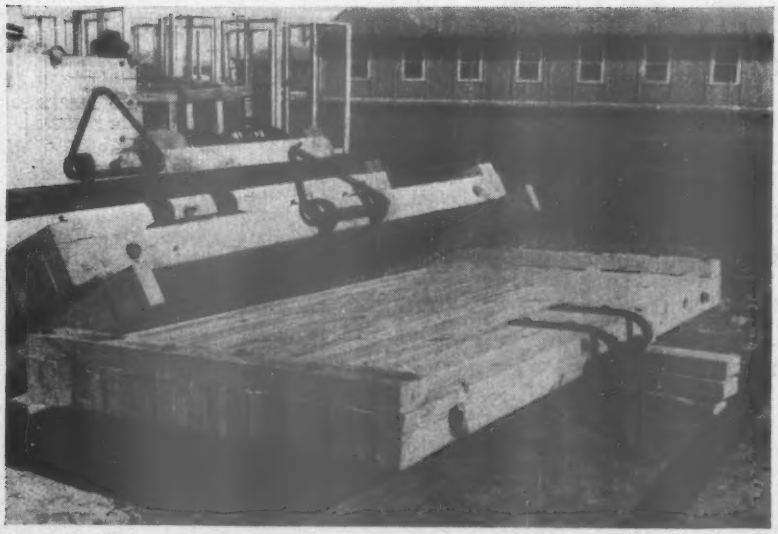
Call Signal System for Oil Field

AROUND a lease or small field it often is desirable to contact different operators or employes working at various places. A major company operating in the Griffin field, Indiana, uses a siren which has been installed at a central point and which is electrically operated from a convenient place in the field office. By different signals any employe wanted can be called.



Flexible Light Connections on Mast Of Truck-Mounted Servicing Unit

A WELL-SERVICING unit with a hydraulically operated mast mounted on a truck has been equipped by the operators with flexible light connections. These enable the operators to keep all lights burning while the mast is being raised or lowered. Generally, it has been necessary to remove the lights when raising or lowering mast, slowing up work of setting up or moving at night. Except at the point of hinging the wiring for the lights is enclosed in tubing securely fastened to mast members.



Sectionalized Mats for Derrick Corners

IN most Gulf Coast fields, even those not located in marsh or swamp areas, the soil is so unstable mats must be laid for the support of the derrick substructure and engine foundations. In one field the operator used corner mats, on which the sills were laid. The mats were constructed in sections, each consisting of a number of timbers bolted together tightly. These could be salvaged as units and moved to a new location. To facilitate handling, each was equipped with a metal hanger or handle to which the winch line could be hooked quickly. In most of the section 4-in. by 6-in. timbers have been used. They are held together by bolts extending through the entire section and by crossmembers bolted at each end.

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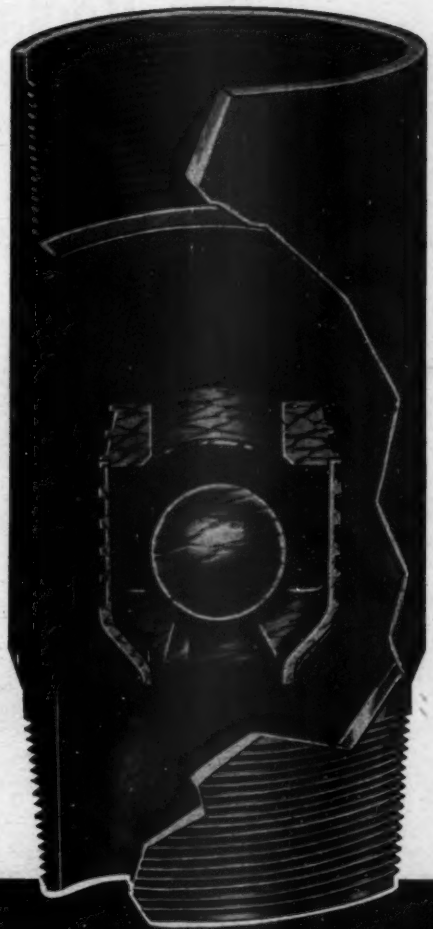


LARKIN HAS CONSISTENTLY BUILT BETTER CEMENTING EQUIPMENT AT NO PREMIUM IN PRICE

Tubular jigs on the production line, with levelers in place and work begun. The large pipe running lengthwise at the base of the jig is of 16-in. material, the base crosspiece is 10-in., the up rights are 6-in. and crosspieces connecting uprights are 4-in. pipe

Aircraft Industry Competing With Oil For Reclaimed Casing and Tubing

by Ralph N. Swanson *

FROM junk dealers' yards, from oil and gas fields, and from abandoned wells and wildcat tests throughout the nation is coming a dwindling stream of strategic material for airplane plants—reclaimed casing and tubing.

The apparently inexhaustible supply has fallen victim to the scrap metal salvage drives and the demand for old pipe which can be used where new pipe was used before priorities were clamped down. Incidentally, second-hand pipe dealers now are buying boiler tubes salvaged from burned out or torpedoed but not sunk ships, and these are being used to supplement oil-field tubing and casing in filling orders from war plants.

The demand is so great that airplane factory purchasing agents have become telephone sleuths, often spending hours at a time calling second-hand pipe dealer after dealer in a hunt for one who can fill an order for old but usable pipe.

Many airplane factories prefer pipe to angle irons in the building of airplane jigs. Jigs are the rigid structures which hold parts while they are being fabricated (drilled and riveted or welded) prior to assembly, or which hold the component parts of a structure while it is being assembled or disassembled.

Airplane factories found that sound old pipe would do as well as new and costlier pipe. Used pipe also has the advantage of having been thoroughly neutralized while in the ground. It has also torsional strength not found in angle irons, channel or I-beam sec-

Arc welding a joint of 8-in. on 10-in. pipe used in building airplane factory jigs

*Curtiss-Wright Corp., St. Louis Plant.

tions. It is a little harder to use than new pipe due to rust. However, perfect welded joints in airplane jigs are not essential, for so long as the jig has a strong joint, there is no need for it to be flawless.

The tubular jig frames require a little more time to build and for that reason are somewhat more expensive than angle iron frames. This additional expense is offset by the fact that the tubular jig frame is more rigid and can be used hundreds of times before reworking is necessary. The angle iron jig has a tendency to get out of line and frequently so much rework is necessary when a jig is moved from one place to another it would take only a little more time to build an entirely new structure than to straighten an old one.

A good example of a tubular jig frame is that used in building spars for the Curtiss-Commando, an Army transport. It is fabricated from tubing and is so rigid that when one corner is raised an eighth of an inch, all locators along one side of the frame will leave the floor on its entire length. No angle iron jig could ever be so rigid. These tubular jig frames can be built in the tool department or wherever convenient and then moved to the production location without any danger of twisting. At that point they can be leveled up with very little difficulty as they hold their shape better and are easier to lift than the angle iron jigs.

In building an angle iron jig, however, the best method is to build it on the spot where it is to be used and fasten it securely to the flood to prevent the jig from changing. This type of jig is used when production is limited to from one to five planes.

When old pipe is needed for jig construction, the purchasing group contacts second-hand pipe companies—sometimes having to telephone all over the United States before the desired size and amount of pipe is located. Pipe of 3 in. to 16 in. in diameter is used and until recently had not been difficult to obtain, excepting for the 16-in. Almost every tubular jig has a length of 8-in. pipe in it, and considerable 6-in. and 5-in.

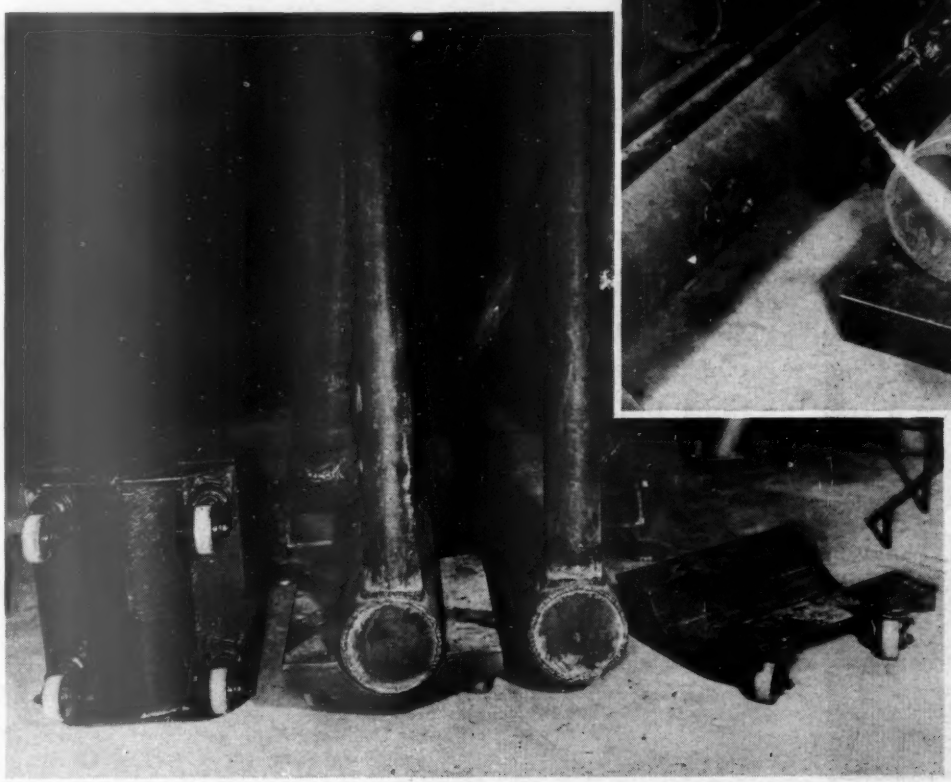
After the pipe has been delivered to the airplane factory, workmen pound it with a hammer, the vibration causing the rust to flake off. After the jig has been made, the pipe is painted in the factory colors.

Jig builders follow plans and specifications, the factory engineers allowing a tolerance of $\frac{1}{16}$ in. in the building of the frames. Parts are cut to length and angle shown by the blueprints, then welded together. Methods of relieving strain caused by the welding are annealing (heating the structure in an oven or furnace and then allowing it to cool very slowly while in the oven) and peening (beating the weld with a blunt instrument).

The result of annealing is about 75 to 90 per cent perfect; the amount of strain relieved by peening is about 50 per cent. In other words, on a peening job workmen save about one-half of the reworks on the jig after it has been completed.

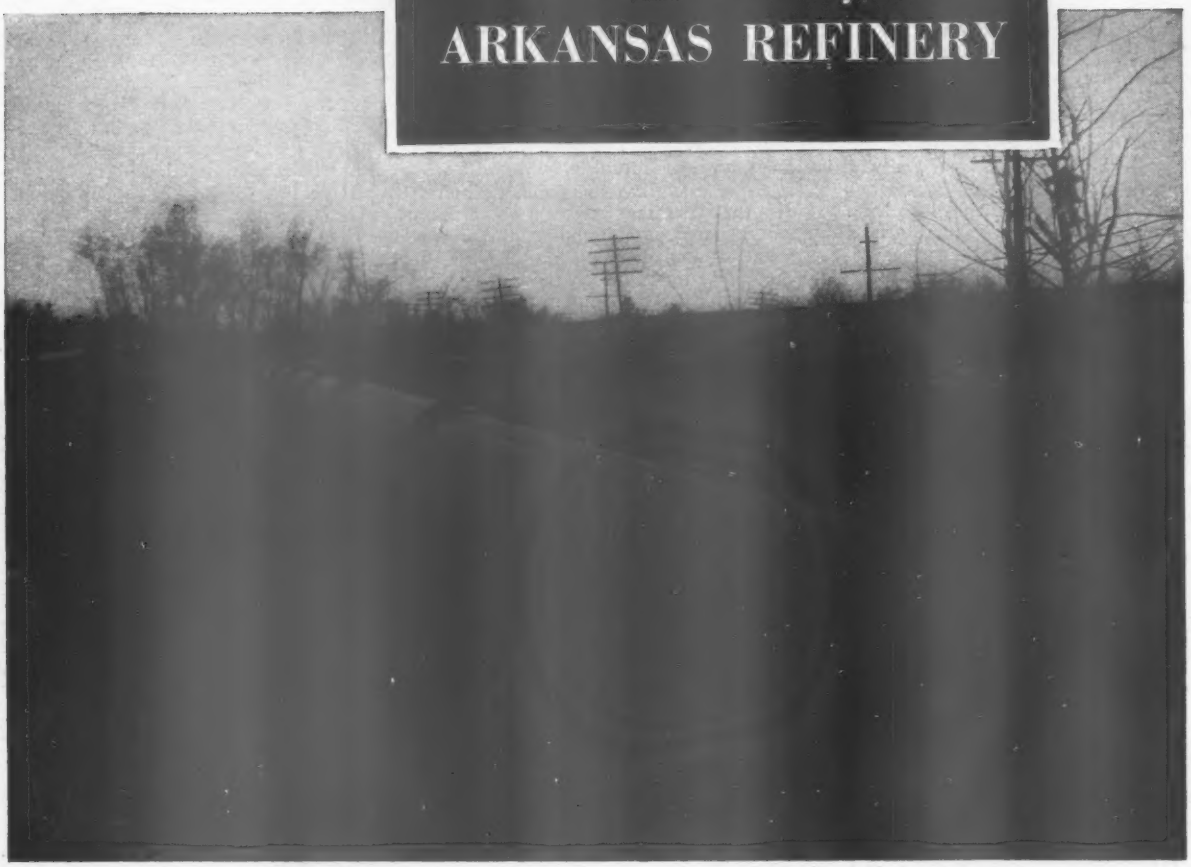
After the jig has been completed, leveling screws are fixed to the bottom of the frame for use in raising and lowering the jig. Locators are then fixed to the jig, with tolerances limited to within 0.005 to 0.010 of an inch. Thereafter the jig is ready to go on the production line.

Right: Welder cuts reclaimed pipe with cutting torch. The pipe rests on roller dollies on which the pipe is rotated during the cutting operation



Left: Jigs are easily moved about on dollies made of old casing, cut in half lengthwise, on which sides and ends have been welded and casters attached

A CAST IRON water line installed by an ARKANSAS REFINERY

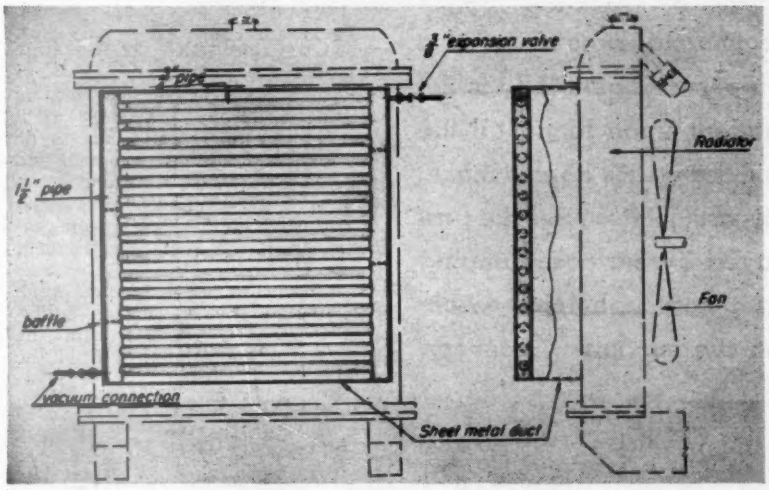


Of *course* it's cast iron pipe, which will outlast the refinery and then present the choice of re-use or salvaging as scrap. But the service of cast iron pipe to the petroleum industry is versatile. Standard cast iron pipe is indicated for cooling and condensing coils, rundown lines, discharge lines, salt water disposal and other applications. Inherently and effectively resistant to corrosion. Low in ultimate cost. Alloy cast iron pipe for supercorrosive conditions is also available. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago, Ill.

CAST IRON PIPE

For Longer Life and Economy

PLANT PRACTICES

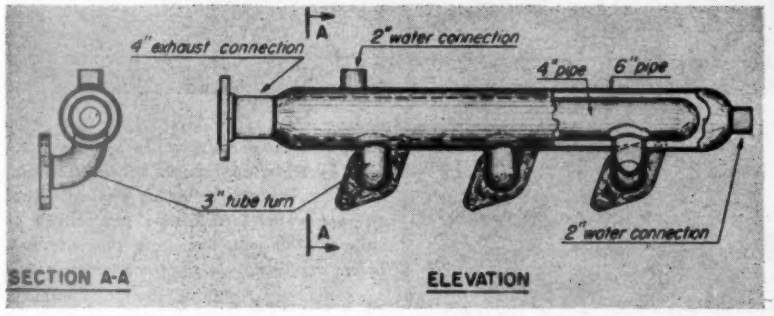


Butane Expansion Cooling Coil

AT a gasoline plant in the Seminole district of Oklahoma, difficulties were encountered through overheating of two engines used to pump water and drive generators. The engines were situated one behind the other in a building and were not getting sufficient ventilation to prevent them from running hot during the summer months. A butane expansion coil was installed which reduced the temperature from boiling point to about 190° F. The butane for this coil comes from the stabilizer unit and is discharged at about 10 in. of vacuum into the suction header of the field units without any loss of operating efficiency.

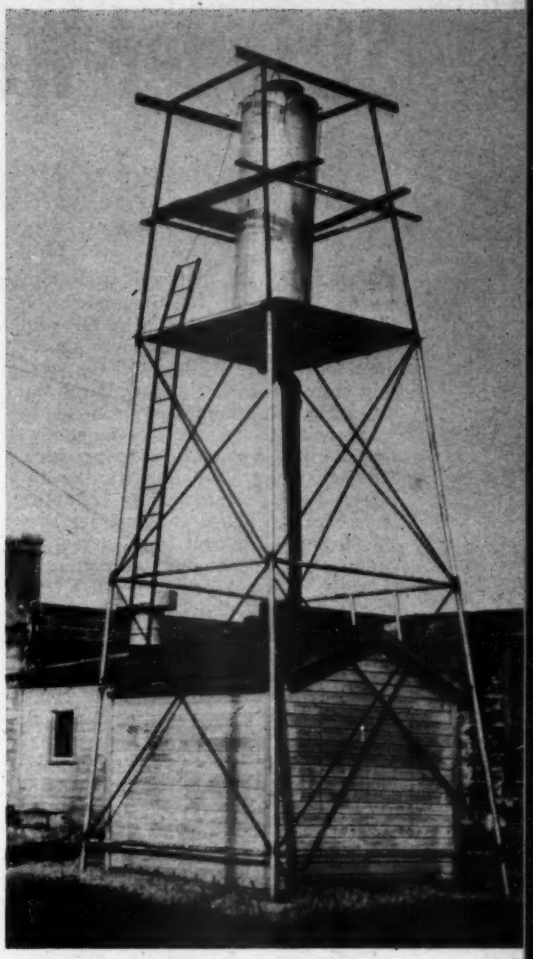
(Courtesy the Empire)

Water-Cooled Exhaust Manifold



IN an Oklahoma refinery, it was found that cast-iron water-cooled exhaust manifolds became so hot that some of them cracked. Due to the thin construction little success was achieved in repairing them owing to the thinness of the walls. The cracking of these manifolds presented an ever-present danger of serious burns. A specially designed electrically welded manifold made up of available surplus materials was installed and has proved satisfactory to date. This manifold constructed of steel, is a little more expensive than the cast-iron manifolds but it is believed that its greater longevity will outweigh the added cost.

(Courtesy the Empire)



Improvised Water Tower From Old Materials

A REPAIR shop needed an overhead water tank and couldn't buy one. Accordingly, an old 3-ft. by 8-ft. separator tank was unearthed, thoroughly steamed out, cleaned, refitted and checked. A 28-ft. high section of an old tubular derrick was collected; legs were 3-in. pipe as were horizontal crosspieces. Diagonal crossbraces were 1-in., welded into the junction between legs and horizontal crosspieces. A platform was built 20 ft. up, of 2-in. by 8-in. boards, resting on the horizontal pieces, and further reinforced by two evenly spaced 4-in. by 4-in. wooden bars attached to the horizontals and with another 3-in. pipe welded to the horizontals to reinforce the platform supports. To this crossmember beneath the platform a tackle block is attached with straps, and may be used to raise equipment on the ground below, such as pumps or engines. A 12-ft. section of the old derrick ladder was fastened to the frame and the tank was connected to a centrifugal pump driven by a single-cylinder gas engine, by a 4-in. line.

Stripper-Well Surface Equipment

by Neil Williams

Commercial production of a stripper well generally is dependent upon lifting all the fluid the well is able to make. This article discusses the part played by surface pumping equipment in helping to obtain the maximum recovery.

IN an article on "Analysis of Pumping Wells" in the December 17, 1942, issue (page 44) of The Oil and Gas Journal, Felix B. Gordon, superintendent of the Buffalo Oil Co., presented methods for determining the efficiency of pumping equipment in small wells in relation to the potential ability of the wells to produce. It was shown that the results obtained from ordinary daily pumping tests do not always demonstrate that the output of a well is all a well is capable of producing. Frequently, there is a loss in potential daily production, due to deficiencies in equipment or in effective mechanical adjustments, not apparent in ordinary pumping tests. Since it often is necessary in the operation of small wells to produce all the fluid a well can make if the well is to be maintained on a profitable and commercial basis, it is essential that deficiencies be known and corrections made so that the fluid produced at the surface of a well is equivalent to the maximum efficiency rate of the pumping equipment.

Pumping Efficiency

Particular reference to pumping efficiency in this article was made to subsurface equipment. This pertained to repair of possible leaks in tubing, elimination of slippage in pumps, replacement of worn pump parts, installation of pumps of sufficient capacity for the quantity of fluid to be handled, proper setting of the pumps in respect to the fluid level, and increasing the speed and length of strokes to an extent that will be adequate to remove the fluid from the well at the rate which the formation is capable of producing.

Another factor to be considered in pumping efficiency, especially as it relates to stripper wells, has to do with surface pumping equipment and methods. Subsurface equipment can be in perfect condition, properly set and adjusted, and of adequate capacity but if the surface equipment is not of suitable type or size or is not properly operated the maximum efficiency of the subsurface equipment cannot be realized, and the greatest possible volume of fluid the well is potentially capable of producing cannot be lifted. Speed and length of strokes are functions solely of the surface equipment. Hence, any increase in well output that is to be obtained by faster and longer strokes is entirely dependent on mechanical adjustments at the surface.

In many cases the surface pumping equipment on stripper wells is in-

(Continued on Page 49)

***Above:** Trailer-mounted measuring tank used by major operator in Oilton-Drumright, Oklahoma district for testing productivity of stripper wells. **Left:** Testing productivity of stripper well with temporary pumping unit before replacing old rig front installation*

Estimated Costs of Mining Oil Shale in Colorado

by E. D. Gardner and Charles N. Bell**

For many years the oil shales of the Rocky Mountain states have been considered a valuable potential source for oil whose usefulness was limited by the excessive cost of mining and treating. This paper presents an estimate of mining costs of the shale and indicates that they are now approximately equal to the price of crude oil they contain. This oil must be extracted before it is available for use and these costs must be added to those of mining in order to secure a comparison with present crude prices.

OIL shale, a long-considered potential source for motor fuel in the United States, is found over an extensive area in the Green River formation in Colorado, Utah and Wyoming. Oil has been retorted commercially from shale in Scotland for many years and work done by the Bureau of Mines and other investigators has shown that it is technically feasible to extract oil from American shales. By refining, the shale oil may be converted into marketable products similar to those from petroleum.

This paper discusses methods which would be adaptable to mining certain American shales, and the treatment applies specifically to conditions in the Green River formation on Naval Oil Shale Reserve 1. The base costs presented in this report should be multiplied by 1.22 since wages in the area have risen approximately 20 per cent, prices of equipment and supplies about 33⅓ per cent while power costs have remained about the same.

Location: The shale richest in oil in the Green River formation on Reserve 1 usually is found near the top of an escarpment and outcrops in long lines of bold cliffs. The relief is, in many places, from 2,000 to 3,000 ft. In this area, the Bureau of Mines has operater an experimental oil-shale mine near Rulison, Colo., for some years and costs presented in this paper are based on actual costs at this point. Other more favorably located areas may be found in the district, in some of which the overburden may be so small as to permit large-scale open-cut mining at lower costs.

The area is 2 miles from a suitable mill-site to which the shale must be transported and from which water for mining operations must be brought, involving a lift of about 2,500 ft.

*U. S. Bureau of Mines. This is a digest of Information Circular 7218 recently issued by the Bureau of Mines. The title of this information circular is "Proposed Methods and Estimated Costs of Mining Oil Shale at Rulison, Colo." A limited supply is available for free distribution by the bureau.

Deposits: About 1,350 ft. of shale was encountered in drilling divided into two parts by a 6-in. iron-stained limestone marker. The richest deposits lie immediately above this marker, a log showing approximately the following oil content in gallons per ton of shale:

495 to 300 ft. about 5 gal. with occasional richer streaks.
300 to 25 ft. about 10 gal. with richer streaks in the upper portion.
25 to 81 ft. Average yield 25.4 gal. with richer belts as follows:
—3.5 to —48.3 ft., 34.8 to 35.9 gal.
—9.5 to —31.4 ft., 41.4 to 47.2 gal.
—81 to —101 ft. less than 5 gal.
—101 to —209 ft. Average 10-15 gal., in alternating rich and lean beds.
—209 to —394 ft. less than 5 gal. with one 17-ft. bed carrying 15 gal.
—394 to —750 ft. Average 10 gal.
—750 to —850 ft. Lean shales with less than 5 gal.

Detailed methods and costs of mining the shale in the richer 20-ft., 44-ft. and 106-ft. sections near the marker bed are presented in the paper. These costs are on the basis of room-and-pillar methods for the 20-ft. and 44-ft. thicknesses and the caving method for the 106-ft. thickness. The minimum tonnage considered would yield 2,000 bbl. of oil daily based on Bureau of Mines analyses and an assumed recovery of 95 per cent on retorting.

Mining would begin about 400 ft. from the portal of the main entry in the cliffs so as not to permit sliding and the shale would be transported from the mine to a treatment plant by aerial tramway.

Costs: The summary of costs per ton for mining 2,000 tons daily from a 20-ft. bed of shale are presented in Table 1. On this basis, it is estimated that the cost of mining 4,000 tons daily would be $0.96 per ton. Allowance should be made for additional

TABLE 1

Summary of Costs Per Ton for Mining 2,000 Tons Daily From 20-Foot Bed of Shale

Development:	Labor	Supervision	Drills and steel	Power	Explosives	Other supplies	Total
Panel entries	$0.014	$0.001	$0.003	$0.004	$0.012	$0.008	$0.042
Ventilation drifts	.005	.000	.001	.003	.004	.003	.016
Room necks	.010	.001	.002	.003	.009	.007	.032
Total development	.029	.002	.006	.010	.025	.018	0.90
Stoping	*.166	*.021	.030	.057	.106	.020	.400
Transportation:							
Scraping	.063	.007	.....	.018	.....	.030	.118
Conveying	.005	.001	.....	.011	.....	.004	.021
Haulage	.029	.004	.....	.011	.....	.011	.055
Total transportation	.097	.012	.....	.040	.....	.045	.194
General underground	.019	.002	.....	.....	.....	.....	.021
Surface expense applicable to underground	.031	.004	.....	.....	.....	.005	.040
Total underground	.342	.041	.036	.107	.131	.088	.745
Coarse crushing	.005	.001	.....	.006	.....	.019	.031
Tramway	.008	.005	.....	.006	.....	.014	.033
Miscellaneous surface	.017	.002	.....	†.005	.....	.....	.024
Total surface	.030	.008	.....	.017	.....	.033	.088
Workmen's compensation	.020	(‡)	.....	.....	.....	.....	.020
Total underground and surface	.392	.049	.036	.124	.131	.121	.853
Deferred development:							
Main entry	.006	(‡)	.001	.001	.002	.004	.014
Ventilation raise	.001	(‡)	.000	.000	.000	.000	.001
Ventilation drift	.003	(‡)	.000	.000	.001	.002	.006
Total	.010	(‡)	.001	.001	.003	.006	.021
Interest and amortization	.....	.....	.....	.....	.....	.130	.130
Grand total	$0.402	$0.049	$0.037	$0.0125	$0.134	$0.257	$1.004

*Stope bosses charged as labor, not supervision. †Pumping, lighting, and miscellaneous power. ‡Included under labor.

WATCH THE BIRDIE!

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All the new branches on the "Rope Family Tree" are being developed as rapidly as nature and ingenuity will permit. But one of the most promising is that limb on which the birdie sings—synthetic fiber.

Already, Plymouth's laboratories have developed a synthetic fiber rope for military use, that has even greater tensile strength than Manila.

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. . . You can depend upon Plymouth to pioneer a way, through experiment with natural fiber, as well as through the development of synthetics, to supply you with the rope you need, as quickly as is humanly possible.

Meantime, save rope, save twine.

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THE *Rope* YOU CAN TRUST

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costs as outlined above on the basis of 1942 prices.

Table 2 shows the estimated cost per ton of mining 5,000 tons daily from the 44-ft. thickness. This would be enough to yield 4,000 bbl. of oil daily.

Table 3 shows a further reduction in costs to $0.576 per ton on mining 10,000 tons daily from the 106-ft. bed using branch raises and to $0.538 using scrapers. The estimated yield is 5,380 bbl. daily.

Table 4 shows the profit that could be expected from mining shale under the various plans considered in this paper. It assumes, for example, a value of $1.00 per barrel for the oil in the shale as delivered to the retorts and a 95 per cent extraction of the oil in the retort. From this table it would seem that mining 5,000 tons daily from the 44-ft. bed would afford the greatest profit, unless the value of the oil in the shale greatly exceeded $1.00 per barrel, in which case the caving method would be most advantageous.

TABLE 2

Summary of Cost Per Ton of Mining 5,000 Tons Daily From 44-Foot Bed

(Twelve 45-hp. electric hoists at $4.05 per horsepower-month)

	Labor	Supervision	Drills and steel	Power	Explosives	Other supplies	Total
Development*	$0.016	$0.001	$0.003	$0.002	$0.014	$0.010	$0.046
Stoping	†.107	†.011	.025	.054	.080	.015	.292
Transportation:							
Scraping	.050	.005	.....	.015	.....	.030	.100
Conveying	.002	.....	.....	.011	.....	.004	.017
Haulage	.023	.001	.....	.011	.....	.011	.046
Total	.075	.006	.....	.037	.....	.045	.163
General underground	.019	.001	.....	.....	.....	.....	.020
Surface expense charged to underground	.025	.002	.....	.....	.....	.005	.032
Total underground	.242	.021	.028	.093	.094	.075	.553
Surface operations:							
Coarse crushing	.006	.....	.....	.006	.....	.019	.031
Tramway	.009	.001	.....	.006	.....	.004	.020
Miscellaneous surface	.009	.001	.....	‡.002	.....	.....	.012
Total	.024	.002	.....	.014	.....	.023	.063
Workmen's compensation	.013	(§)	.....	.....	.....	.....	.013
Deferred development¶	.006	.....	.....	.....	.002	.002	.010
Interest and amortization	.....	.....	.....	.....	.....	.073	.073
Grand total	$0.285	$0.023	$0.028	$0.107	$0.096	$0.173	$0.712

*Includes panel entries, room necks, and ventilation. †Stopes bosses are charged as labor, not supervision. ‡Includes power for lighting, pumping, and shops. §Included under labor. ¶Includes main entry, ventilation raise, and part of the ventilation drifts.

TABLE 3

Summary of Costs Per Ton for Mining 10,000 Tons Daily From 106-Foot Bed of Shale

	Using branch raises	Using scrapers
Drawing, at 100 tons per man = $4.50	$0.045	$0.045
Scraping	.000	.030
Development work and stope preparation	.296	.235
General underground expense	.030	.030
Underground transportation	.050	.050
Surface labor charged to underground operations	.025	.025
Supervision, including engineering	.027	.027
Crushing	.030	.030
Tramway	.020	.020
Workmen's compensation	.010	.010
Interest on $1,400,000 at 6 per cent, and amortization over 15 years and 72,000,000 tons	.043	.050
Total	$0.576	$0.538

TABLE 4

Summary of Profit Per Ton in Mining Various Thickness of Oil Shale

Thickness of shale, (ft.)	Grade of shale, gal. per ton	Recovery of oil, gal. per ton	Shale mined per day tons	Oil production, bbl. per day	Value of oil recovered per ton of shale*	Cost of mining shale, per ton	Indicated profit, per ton	Indicated profit, per day
20	44.3	42.1	2,000	2,000	$1.002	$1.004	Loss	.....
20	44.3	42.1	4,000	4,010	1.002	.964	$0.038	$152
44	35.4	33.6	5,000	4,000	.800	.712	.088	440
†106	‡23.8	22.6	10,000	5,380	.538	.576	Loss	.....
§106	‡23.8	22.6	10,000	5,380	.538	.538	0	0

*Value of oil recovered, minus cost of retorting. †Using branch raises. ‡Allowing for 10 per cent dilution. §Using scraper system.

Surface Equipment for Stripper Wells

(Continued from Page 46)

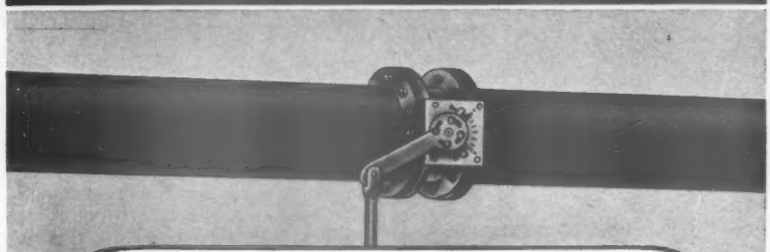
capable of lifting more fluid. Much of it, by reason of the age of the wells and original installations not having been replaced, is old. Frequently, it consists of assortments of more or less obsolete types of rig fronts, makeshift central power hookups, or improvised units and jacks in multiple operation. Sometimes it is patched together with junk. Old assemblies and practices often do not permit flexibility in pumping individual wells to obtain the most effective results. Along with this, operating and maintenance costs of this type of equipment may be so uneconomical that profitable production of wells is difficult.

By replacement of the old pumping equipment and practices with more modern facilities and methods it is probable that the production of many stripper wells can be materially increased and more efficient and profitable operation established. Various operators have been doing this where conditions have warranted. In this principal consideration has been given the installation of individual pumping units or more effective multiple well hookups. However, before changes are made thorough testing of a well's productivity is necessary to determine whether the increases in recovery plus operating economies that might be possible by use of new equipment are enough to justify and pay out the costs of the replacement.

Testing Individual Articles

Determination of whether to replace old types of pumping equipment with more modern individual units usually is a matter of actual physical tests in which pumping records with an individual unit on the well are compared with those when the old equipment is used. For this a temporary pumping unit installation is made, leaving the existing equipment in place except for changing over the rods. Production tests then are made under various operating conditions over a period of whatever time is desired. The tests may be altered with production tests with the old equipment simply by changing over the rods. Where a company has numerous stripper wells within a certain district, a separate pumping unit, mounted on skids for portability to facilitate moving easily from well to well, sometimes is maintained for this purpose. After completion of the tests the most adaptable type and size of equipment can then be determined and installed. A similar procedure often is followed to determine the most appropriate equipment to be installed on wells to be placed on the pump for the first time.

Uniform Pressure Obtained in Inaccessible Line



Uniform pressure is obtained on the downstream side of an R-S Butterfly Valve in an inaccessible line by means of an extended reach rod and an electric motor. The declutching unit and hand wheel control is used when the power fails. Can be powered by an air diaphragm motor or hydraulic cylinder.

As the illustration indicates, the beveled vane closes naturally against the body of the valve and at the correct angle for the wedge-tight shut-off of any material that flows or is forced through a pipe. Machined to exceptionally close tolerances.

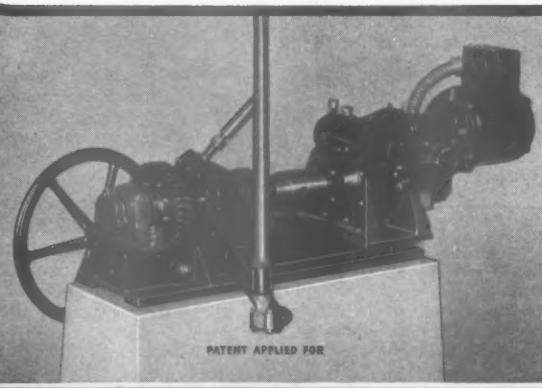
Streamlined construction induces self-cleaning. Maintenance is no problem —constructed to last for years. Sizes to 84-inches and pressures to 600 pounds.

Write for catalog, approximate weights and detailed dimensions.

BUTTERFLY VALVE DIVISION

R-S PRODUCTS CORPORATION

4538 Germantown Ave Philadelphia, Pa.



R-S Streamlined BUTTERFLY VALVES

During pumping tests, a small tank usually must be set up at the well for measuring the production. On some leases the regular tank battery may include means for handling and gaging production of individual wells separately but this generally is not the case. Tanks set up can be of a portable type and size then be moved easily as a unit. One company in the Oilton-Drumright district of Oklahoma has built a production measuring unit with a 6-bbl. tank mounted permanently on a two-wheeled trailer (see accompanying picture) which can be towed behind any car or truck to the well to be tested. The whole unit is rolled directly onto the well floor, and through a hose connection to the lead line from the well the production is pumped into an opening in top of the tank. When the test is completed or the tank full, the unit is towed to lease storage or disposal sump for emptying. The trailer is equipped permanently with a small pump for emptying the fluid. However, any type of small tank serves the purpose.

Lease Tank From Scrap

A "NEW" lease tank from an old one with the rust of 10 years or more on its sides is the newest acquisition of Grimes-Neal gasoline plant near Drumright, Okla. Drilling a new well and needing a lease tank to take care of probable contingencies; consulting the suppliers and finding no tanks available for purchase, these people scouted around this aging field. They found an old gasoline tank which though rusty looked good, hauled it up to the plant, found the bottom rusted out, entirely unrepairable, though sides and top of the tank were in fairly good condition.

Nearby was another old tank which had one expanse of ¼-in. sheet which was in good condition. The first tank was cone-roofed, 7 ft. in diameter by about 9 ft. high. From the second tank a disk was cut by torch, 1 in. larger in radius than the tank to be rebottomed. This disk was placed on brick supports a short distance from the ground; the tank was washed and steamed to remove the asphalty sediment in it, the rotten bottom was cut away, and the tank swung over and placed carefully on the new bottom disk. With 14 welding rods the new ¼-in. bottom was welded to the tank wall. A new gasket was put on the rectangular 18-in. by 22-in. manhole near the tank bottom; threads in sleeves, welded to the tank years ago were cleaned out by retapping; the top vent cover plate was cleaned up, 3-in. lines—already available—were attached to the tank and it is ready to catch the production from the new well when the latter is finished. The whole job cost about three man-days' work, expense about $25.

Fewer Accidents Reported by Participants in Safety Contest

CHICAGO, Ill. — The average accident frequency rate for participants in the National Safety Council's 1941-42 Petroleum Section safety contest was 3 per cent below that for the previous contest, the council reported last week, in spite of a larger number of competing companies than ever before.

The average frequency rate for all contest divisions was 8.88 reportable injuries per 1,000,000 man-hours worked.

Manufacturing units had the lowest rates, averaging 5.42. Drilling units had the highest rates with an average of 41.68.

Seventeen contestants in various divisions went through the year without a single reportable accident.

Winners in the various divisions are:

Manufacturing Division

(Large plants—average rate, 5.21)

1. Standard Oil Co. (Indiana), Chicago, 0.86.
2. Humble Oil & Refining Co., Houston, Tex., 1.25.
3. Standard Oil Co. of Louisiana, Baton Rouge, La., 2.52.

(Small plants—average rate, 8.20)

1. Stanolind Oil & Gas Co., Tulsa, 0.0.
2. Colonial Beacon Oil Co., Inc., Everett, Mass., 1.05.
3. Ohio Oil Co., Findlay, Ohio, 2.25.

Natural-Gasoline Division

(Average rate, 7.25)

1. Gulf Companies, Houston, Tex., 0.0.
2. Humble Oil & Refining Co., Houston, Tex., 2.09.
3. Skelly Oil Co., Tulsa, 2.83.

Oil and Gas Pipe-Line Division

(Large plants—average rate, 8.06)

1. Gulf Refining Co., Houston Pipe Line Division, 3.87.
2. Stanolind Pipe Line Co., Tulsa, 4.03.
3. Shell Oil Co., Inc., Shell Pipe Line Corp., Houston, Tex., 4.82.

(Small plants—average rate, 9.75)

Six companies tied with perfect records of no accidents. They are listed in the order of the total numbers of man-hours worked by employes, the first named having the largest total:

National Transit Co., Oil City, Pa.; Kaw Pipe Line Co., Tulsa; Arkansas Fuel Oil Co., Shreveport, La.; Ajax Pipe Line Corp., Tulsa; Sun-Yount-Lee Pipe Line Co., Sun Oil Co., Dallas, Tex.; Tide Water Pipe Co., Ltd., Bradford, Pa.

Producing Division

(Large plants—average rate, 12.51)

1. Gulf Oil Corp., Gulf Production Division, Houston, Tex., 5.05.
2. Continental Oil Co., Ponca City, Okla., 5.70.
3. Stanolind Oil & Gas Co., Tulsa, 6.14.

(Small plants—average rate, 17.34)

1. Lario Oil & Gas Co., Wichita, Kans., 0.0.
2. Atlantic Refining Co., Dallas, Tex., 2.93.
3. Hope Construction & Refining Co., Pittsburgh, Pa., 6.35.

Drilling Division

(Average rate, 41.68)

1. Continental Oil Co., Ponca City, Okla., 17.27.
2. Stanolind Oil & Gas Co., Tulsa, 18.53.
3. Gulf Refining Co., Gulf Production Division, Houston, Tex., 18.68.

GOOD NEWS
FROM THE HEAT EXCHANGER FRONT
STERLING SECTIONS AGAIN FABRICATED
No Critical Materials Used. Available for Immediate Shipment
BUFFALO, N. Y.—At one time a favorite in 85% of America's refineries, but discontinued shortly before the war, Sterling Condensing and Cooling Sections are again in manufacture.
This step has been taken purely as a war measure. Undoubtedly it comes as the best news in months to petroleum, gas and chemical plants troubled no end with problems of revamping, repairing or expanding their present Sterling installations.
To plants now using, but unable to re-purchase shell and tube heat exchangers, open sections and other types of liquid cooling and condensing equipment which require steel, copper and brass, it means the immediate availability of a worthy substitute.
Manufactured by American Radiator and Standard Sanitary Corp. for exclusive distribution by Ross, Sterling Sections contain no critical materials — completely made of corrosion-resisting Arco Cast Iron. They can be spray-cooled or submerged in wooden boxes. Furnished in individual sections, they can be assembled in almost any place or space, and are easily accessible for service, replacement or repairs.
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New Bulletin 3626 gives complete information. Write at once for your free copy.
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LIBERTY

versus

Compulsion

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The struggle is between two totally opposite ideologies. One is based on brute force, the top gang keeping its power by compulsion. The other is based on logic and persuasion, the leaders obtaining office by vote and remaining there only by the consent of the governed. Under regimentation creative research congeals and the masses produce and fight as sullen slaves. Under democracy creative research is stimulated and mass production multiplies. Soldiers go to battle with unbeatable spirit because of the determination of free men to maintain that priceless gift which they have won after ages of fighting and which they will never give up . . . the gift of liberty.

When the war is won and we return to peace time pursuits there will still be a big job to do in rehabilitating a broken world. People everywhere will look to America. Our business men and leaders will have a great responsibility and a great opportunity. In keeping with this thought the Mission Manufacturing Company is planning many advancements and improvements in its products for the benefit of oil men who will be busy to a degree never before experienced. In the meantime war comes first.

Buy Bonds for Victory

and to insure a strong and stable United States when the war is over.

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PIPE-LINE SUGGESTIONS

Equipment shown on this page was observed on the construction of the War Emergency Pipelines, Inc., 24-in. crude-oil line.

Bending Shoe for 16-In. Pipe

BENDING shoes of a type which are attached to the lower part of boom equipment on tractors have been made by several construction organizations during the past 2 years for pipe up to sizes as large as 12-in. It has been widely believed that larger pipe could not be bent advantageously with this device. In the laying of 16-in. pipe for the WEP feeder lines connecting with the Longview, Tex., terminal, the contractor has employed a shoe of this kind. It is pivoted so as to swing with the pipe. One of the photographs shows bending done by three tractors: one holds down the pipe with the shoe; this tractor is held in position by a cable through a block at the top of side-boom which extends to another tractor outside the picture; a third tractor raises the end of the pipe by a winch line to a height required for the desired degree of bend.

Jig for Welding Station Piping

FABRICATING piping for all WEP pump stations from Longview, Tex., to Norris City, Ill., was done at a central yard near Little Rock, Ark., where the contractor employed special turntables rotated by the welder's helper so that a roll-welding procedure might be used conveniently. The circular rail or hoop which is manipulated by the welder's helper is of sufficient diameter for handling easily so that the nipples and flanges may be turned steadily at the rate desired by the welder. Part of the fabricating was done by welders working in the yard. Fittings were brought to the shed sheltering the two turntables by a side-boom tractor. From the yard, piping was shipped to each station. Fabricating done at the Little Rock yard comprised practically all of the piping installed at the stations with the exception of the low-pressure manifold for the Longview station which was made on the location.

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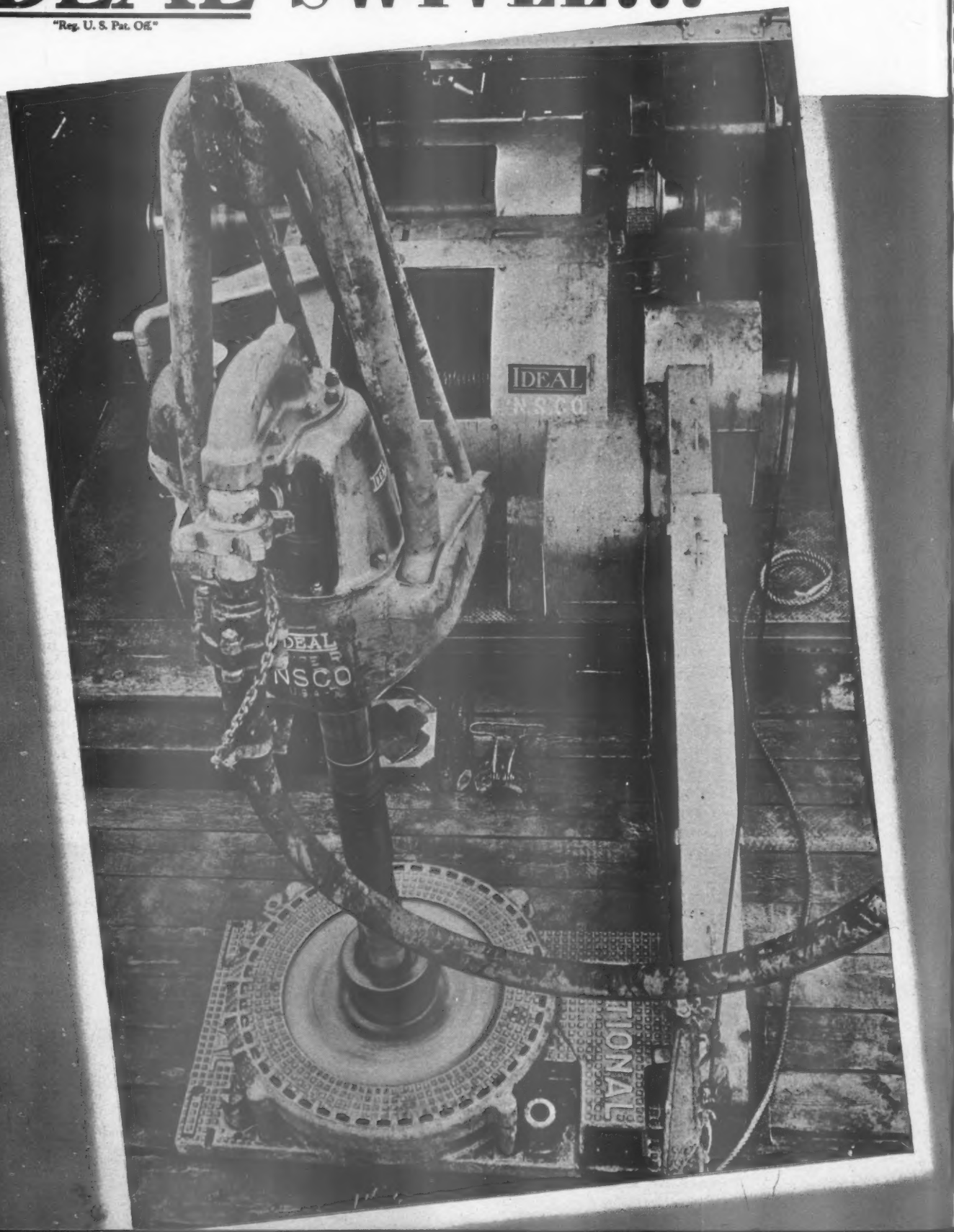

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

USE OF WELDED CASING FOR SURFACE AND OIL STRINGS

THE use of welded casing for surface, intermediate and oil strings in place of threaded-and-coupled pipe has been proved over a period of about 4 years. During that time considerable improvement in the method has reduced the cost of this operation to where it merits more widespread consideration. Unfortunately, people not familiar with the subject place more weight on the single failure, which happened about 4 years ago, than they do on the millions of feet of welded pipe successfully run.

The failure referred to occurred when an attempt was made to run Grade D (now N-80) pipe in an 8,000-ft. well and the string subsequently parted, necessitating a fishing job. It is understood that, through the use of the welded casing, the savings accruing up to that time were wiped out. Investigation showed what caused the failure, led to more detailed knowledge of the welding of casing on the derrick floor, and removed the few danger spots. It developed that Grade D (now N-80) pipe could be welded in the field providing it was preheated and sufficient time allowed before quenching. Other grades of pipe, J-55 and H-40, can be field-welded without preheating and sufficient data are now available to determine the safe quenching time for all grades of steel.

This background is given to show that there is no reason for not welding steel casing in the field although it is by no means a widespread practice, being restricted to a few companies. There is ample material in the literature to show its possibilities and those who have used welded casing strings are firm in their recommendations. In addition, the recent development of the pressure-welding method may be an influence on future practice.

Field-welding of casing is not a practice developed just to prove a metallurgical point, nor a means of selling welding materials. It was developed to reduce the cost of casing strings by eliminating the threads and collars on threaded-and-coupled pipe. Greater structural strength resulted from welding than from the threaded-and-coupled method of joining the pipe sections. In addition the welded casing strings permitted the use of smaller surface and intermediate strings and larger oil strings. Originally, however, the main objective was the reduced price of the plain-end pipe for welding as against the threaded-and-coupled pipe.

Seamless, butt-welded and spiral-welded pipe have been used for welded casing strings in the field. There are two types of end in use at present, the most commonly used one being plain-end pipe with a bevel for welding. The other is the bell-and-spigot joint with the welding beads being run around the lip of the bell. A slight charge is added for belling the ends of the pipe.

The mill-basing price of random lengths of plain pipe is 10 per cent under the lowest established price for threaded-and-coupled pipe of the same grade and size. The lowest established price is for standard threads and couplings rather than the long threads and couplings, which cost extra. Instead of a 3,200-ft. string of 8⅝-in. pipe, costing around $5,458 for threaded and coupled, it costs about $4,913 for the welded string.

However, the savings may be even greater in some instances due to the fact that a weld can be made which will be as strong as the pipe body. If the string fails the fracture just as likely will be in the body of the pipe as it will at the joint. In threaded-and-coupled casing the failure is generally at the joint. This is due to the fact that the tensile strength of the joint is not as great as that of the pipe. The cost situation is aggravated by the use of a safety factor of 2½. Such a safety factor is not needed for casing which is joined by welding. For instance, 5½-in., J-55, 20-lb. pipe can be set to 15,000 ft. with a safety factor of 1.5 in resistance to collapse. This same pipe has a setting depth in tension of 8,220 ft., with a safety factor of 2.5, when using the long thread and coupling. Converting to a common factor of safety would give a setting depth of 13,700 ft. and it is highly doubtful if any manufacturer would recommend running the tension load as high as that, whereas a safety factor of 1.5 in collapse is not considered too risky. Where long strings are concerned, this is an important point in design.

Actually, the biggest savings in using field-welded casing is in the saving through reduction in the size of the hole drilled to run a specified internal-diameter casing, and the reduction in the size of the intermediate and surface strings. The matter of clearances was touched on briefly in a previous discussion on slim-hole casing programs.

While it is virtually impossible to run 5½-in. threaded-and-coupled casing inside of 7-in. (o.d.) casing, it is a simple matter to run 5½-in. welded casing inside the 7-in. pipe. The clearance when using threaded-and-coupled pipe is about 0.114 in., while welded casing gives a clearance of 1.075 in. Instead of having to add from 0.5 to 1 in. to the diameter of the pipe because of the couplings, one can use the outside diameter of the inside string of pipe and the drifted inside diameter of the outer string. A well can be completed with a 7-in. or 7⅝-in. surface string and a 5½-in. welded oil string. To use the 5½-in. oil string with threaded-and-coupled pipe would require at least 8⅝-in. surface pipe. The clearance of the 5½-in. welded casing in any hole size is only 0.136 in. less than that of threaded-and-coupled 4½-in. pipe. The price for the larger pipe (welded) would be about 20 per cent greater instead of the approximately 40 per cent differential existing between the two sizes of threaded-and-coupled pipe.

There are a few drawbacks to welded casing, the principal one being the additional cost for welding and the additional rig time required to run the welded string. Rig time at present is about 75 per cent greater for running a welded string than for a threaded-and-coupled string. In addition, the welding charge will run from less than a hundred to several hundred dollars, depending on the length of the string. However, this increased cost is more than offset by the saving in the original cost of the plain-end pipe over the threaded-and-coupled pipe. Where it is highly important to get the casing in the hole as rapidly as possible, the threaded-and-coupled pipe holds an edge. However, this may change in the near future and it may then take no longer to run welded casing than it does threaded and coupled.

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HELPING BUILD ARKANSAS

Engineering Fundamentals No. 64

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

ANALYSIS OF NATURAL GAS BY SLOW COMBUSTION METHOD

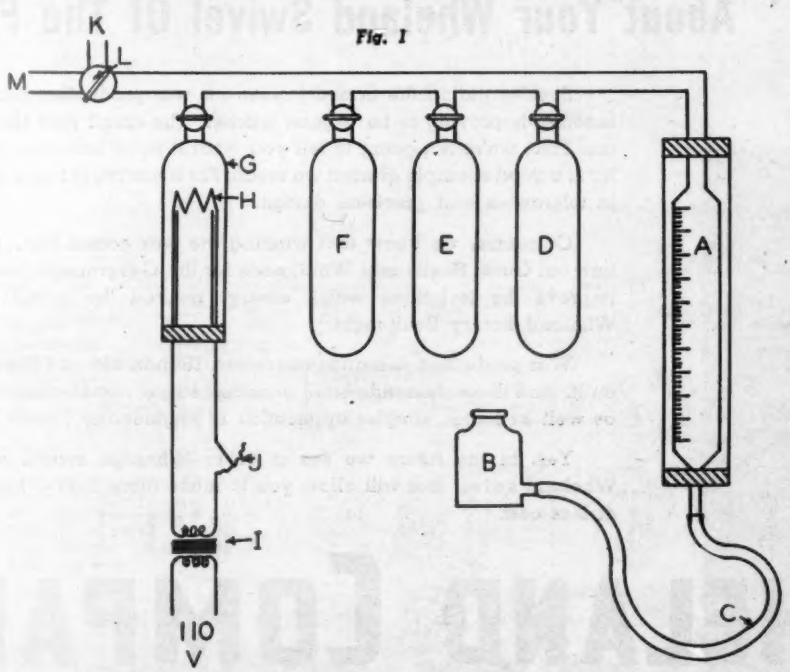
ONE of the methods by which natural gas may be analyzed is ordinarily termed the slow combustion method. Satisfactory results may be obtained with this method if the gas contains no other constituent than the ones listed as follows: carbon dioxide, oxygen, carbon monoxide, methane, ethane, and nitrogen. Since natural gas which is used for fuel has usually been scrubbed of all appreciable amounts of the hydrocarbons heavier than ethane before burning, the analyses of natural gas for use in combustion calculations can be obtained by this method. By this method it is impossible to obtain a complete analysis of a natural gas which contains more than two hydrocarbons of the same series.

Hydrogen sulfide content of a natural gas is measured separately.

The slow combustion apparatus is shown diagrammatically in Fig. 1. It consists of a graduated cylindrical burette (A) for measuring gas volumes used in the determination. This burette is fitted with a levelling bottle (B) which is connected to the lower end of the burette by a flexible hose (C). There are three absorption pipettes (D, E, and F) for absorbing certain constituents of the natural gas. Pipette D contains potassium hydroxide which will absorb any CO_2 that may be in the gas sample. Pipette E contains potassium pyrogallate which absorbs O_2 from the gas sample. Cuprous chloride, which will absorb CO, is contained in pipette F. The combustion pipette (G) is a pyrex glass bulb fitted inside with a platinum filament (H) which can be heated electrically by connection to a battery or transformer (I). A rheostat (J) is connected into the filament line to allow close control of the temperature of the filament.

In using the apparatus, a sample of gas is brought in through connection K, by proper manipulation of stop cock L, and measured above mercury in the burette A. A volume of 100 cc. is a convenient size for this sample. The burette A is surrounded by a water bath so that all gas volume measurements will be made at a constant temperature. All gas volume measurements must be made with the mercury level in the bottle B at the same elevation as the mercury in the burette A.

Fig. 1



After measurement of the original gas sample, the sample is displaced, by raising the levelling bottle, over into the absorption pipette D where it makes intimate contact with the absorbing liquid. The sample is then transferred back to the measuring burette (A) and the volume of the gas again determined. Any reduction below the original volume is due to CO_2 absorbed in pipette D. In like manner, the gas can be tested for CO_2 and CO content in pipettes E and F, respectively.

Now, only about 30 cc. of the residue gas remaining after absorption in the three pipettes is kept, the excess beng discharged into the air. The 30 cc. volume of residue gas is then stored temporarily in the pipette D while pure O_2 is introduced through connection M into the measuring burette. A volume of about 100 cc. of O_2 is measured and then transferred to the combustion pipette. The filament is now heated electrically to a bright yellow color. The residue gas (CH_4, C_2H_6, and N_2) after being accurately measured, is passed slowly into the combustion pipette where the hydrocarbons burn to CO_2 and H_2O. The water formed will condense and occupy a negligible volume. So, assuming the original gas sample contained N_2, the dry residue gas remaining after combustion contains CO_2, O_2, and N_2. The volume of this residue gas is now measured in burette A.

Next, the CO_2 contained in the residue is absorbed in the pipette D and the remaining volume is measured.

It should be pointed out that there may be slight variations from the procedure just described to fit the particular gaseous mixture being analyzed and the particular apparatus used, nevertheless, the basic principles involved remain the same.

Results obtained by this method will be on a dry basis; that is, the percentage of water vapor in the original sample is not measured.

From the measurements that have been described, sufficient data will be available for the calculation of the dry analysis of the original natural-gas sample. The calculations are based on the combustion equations for methane and ethane along with data taken on the test. A discussion of the method of calculation will be given in the next installment.

This Small Part Has Taught Us A Lot About Your Wheland Swivel Of The Future

Besides aiding the armed forces, our war production here at Chattanooga is proving to be a good teacher. The small part shown above (no, Tojo, we're not going to tell you what it is, or how you can imitate it!) is a good example of what we mean. For it has taught us a few lessons in tolerances and precision design.

Of course, we know that winning the war comes first. Yet, as we turn out Guns, Shells and Windlasses for the Government, we naturally improve the technique which always insured the sound quality of Wheland Rotary Equipment.

War production demands exactness. Human life and liberty depend on it. And these demands have uncovered new combinations of metals, as well as better, simpler application of engineering "know how."

Yes, in the future we see a better Wheland swivel for you. A Wheland swivel that will allow you to make more hole — faster, better, at less cost.

DISTRIBUTORS:

Lucey Products Corporation, Tulsa, Oklahoma

Houston Oil Field Material Co., Inc., Houston, Texas

Murray-Brooks Hardware Co., Ltd., Lake Charles, Louisiana

Frick-Reid Supply Corporation, Tulsa, Oklahoma

EXPORT:

Lucey Export Corporation, 3505 Woolworth Bldg., New York, N. Y.

Broad Street House, London, E. C. 2, England

THE WHELAND COMPANY

ROTARY DRILLING EQUIPMENT

Chattanooga, Tenn.

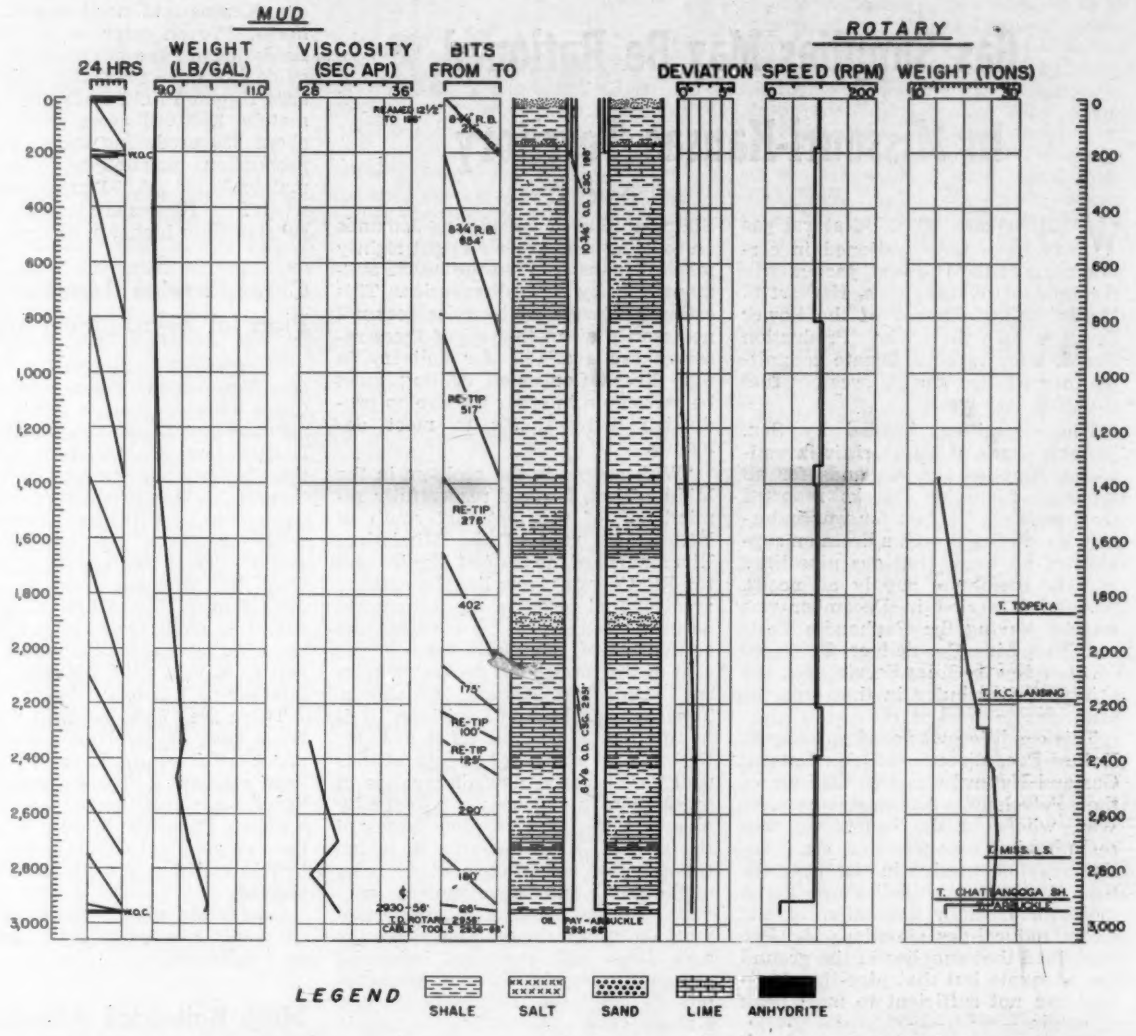
DEEP ROCK OIL CORP. 1 ECKEL

C E½ SE NW 32-29s-4e, Elevation 1,172 ft.

CONTRACTOR

ZEPHYR DRILLING CO., TULSA

Discovery Well, Douglas Pool, Butler County, Kansas



Type of rig .... Portable mechanical rotary
Fuel ..... Butane
Size drill pipe ..... 4½-in.

Time record:

Elapsed drilling time (T.D. 2,956 ft.)	12 2/3 days
Moving in and rigging up	2 2/3 days
Net time drilling, coring and reaming	199½ hr.
13 round trips	18 hr.
Circulating, hole surveys, electrical log, laying down pipe and shutdowns	44 hr.
Running casing and W.O.C.*	73 hr.
Number of cores	†2
Electrical log (from bottom)	1
Hole surveys	10

*48 hours allowed for W.O.C. on oil string. Additional time waiting on cable tools before drilling plug.

†First core 2,930-48 ft., 7-in. core head; second core 2,948-56 ft., 6¾-in. core head.

BIT RECORD

Number bits	Type	Size
*11	Rock bit	8¾-in.
1	Core head	7-in.
1	Core head	6¾-in.

*Surface hole drilled with 8¾-in. bit and reamed to 12¼-in.

Bits include four new and seven retipped bits.

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
10¾	40	198	140
6⅝	28	2,951	100
2½ upset	...	2,950	...

DRILLING MUD*

Aquagel ..... 25 sacks
Hulls ..... 13 sacks

*Hole drilled with water. Fifteen sacks Aquagel and 5 sacks hulls added for surface hole. Eight sacks hulls added below surface pipe, and 10 sacks Aquagel added for coring and running oil string.

COMPLETION DATA

Tools ..... Portable cable rig
Depth cable tool hole ... 2,956-66 ft.
Producing horizon ..... Arbuckle lime
Acidized ..... 1,000 gal.
Date plug drilled 11-19-42
Date completed 12-5-42

PRODUCTION TESTS

Hole filled 2,000 ft. in 1¼ hours and flowed over control head in 4 hours after drilling plug. Shut in for storage, T.D. 2,956 ft. Swabbed and flowed 40 bbl. per hour with fluid level at 2,156 ft. on temporary productivity test.

Pumping test:

Depth ..... 2,966 ft.
Drawdown productivity ..... Maximum

Natural Gas

Gas Supplies May Be Rationed In Missouri-Kansas Territory

WASHINGTON, D. C.—Natural gas may have to be rationed in certain parts of the Midwest, particularly the Missouri-Kansas area, Herbert S. Marks, acting director of the Power Division of the War Production Board, told a special Senate committee investigating the midwestern fuel situation last week.

The committee, headed by Sen. Bennett Clark of Missouri, is investigating supplies and demands for all types of fuel. Mr. Marks reported that demands for fuel for war industries have caused such a drain on supplies of all kinds that gas pipe lines may be unable to supply all needs. A difficult period in December was met by having the Panhandle Eastern Pipe Line Co. deliver 25,000,000 cu. ft. a day to Cities Service Co., the principal distributor in that area, he said.

This condition was confirmed by E. Holley Poe, director of the Natural Gas and Natural Gasoline Division of the Petroleum Administration for War, who told the committee that some major gas pipe-line construction may be needed in the near future if adequate supplies are to be maintained. In a discussion of the entire natural-gas situation, Mr. Poe explained that supplies in the ground are adequate but that pipe-line facilities are not sufficient to meet peak demands.

"The known natural gas reserves of the nation," Mr. Poe told the committee, "are today greater than ever before. They are something in excess of 85 trillion cubic feet and on the basis of present sales constitute something more than a 25-year supply. While these figures give the over-all picture, it is a fact that these reserves, because of their location, are not in all cases readily available to all of the marketing areas of the United States. It is also a fact that some of the present consuming areas do not have the full advantage of the major reserves by reason of lack of pipe line deliverability.

"It is my opinion that we have not yet discovered all of the natural gas reserves that exist in the United States, so that in considering demands on existing reserves we might rightly take into consideration the future augmentation by new discoveries. This estimate of reserves likewise does not necessarily mean that all of these reserves are available for delivery in pipe lines. Continued drilling must be carried on in order to develop production deliverability to meet demands.

"With regard to the problem in the Middle West, I would respectfully remind you of the fact that south of latitude 39, west of the Mississippi River, north of the Gulf of Mexico and the Rio Grande rivers lies the nation's greatest fuel reserves. In the case of natural gas reserves, it contains the equivalent of something over 70 per cent of the total. This region includes the states of Kansas, Oklahoma, Texas, Arkansas, and Louisiana. It is in this region that we must look for the greatest source of supply of natural gas, because new discoveries of production in the area are generally more prolific than in other areas of the nation. It is the area in which the greatest encouragement for new exploration and development prevails. Besides serving the important markets within these states, there are such large and important industrial centers as Detroit, Chicago, Minneapolis, St. Paul, Omaha, St. Louis, and Kansas City. The ability to supply the demand of these markets is limited only by the deliverability of existing pipe-line systems. With respect to other markets within the six states being discussed, which are not attached to trunk line systems, the greater part of the gas produced and marketed is being produced from old fields which are now nearing depletion and from which gas is being taken during peak load at peak deliverability. Oklahoma is producing almost entirely from highly depleted pools. There are some new pools such as the Cement area, and the deeper sands in the Chickasha area, but the demands on these fields indicate that their depletion will be rather rapid. The old pools of Kansas appear to be from 50 to 80 per cent depleted. In this area and in northeastern Oklahoma, the provisions of Limitation Order M-68 were relaxed to allow as great a development as possible to take care of the current winter's requirements.

"Within this area, however, there are large reserves such as the Amarillo field in the Texas Panhandle, and the Hugoton fields in southwestern Kansas and northwestern Oklahoma. Proven reserves in these two fields are on the order of 30 trillion cubic feet. The more recently discovered Hugoton field embraces approximately 1,500,000 acres and now has about 330 producing wells. The 1941 production amounted to approximately 36,400,000,000 cu. ft., and 1942, when final figures are in, will indicate substantially higher withdrawals."

Cities Service Renews Plea for 26-In. Line Pipe

In an effort to correct the shortage condition on the "east side" of the Cities Service system which serves northeastern Oklahoma, southeastern Kansas and southwestern Missouri, the company has renewed its application to the War Production Board for equipment to drill more than 100 gas wells in Texas County, Oklahoma, and for 250 miles of 26-in. gas line from the Hugoton field to a point near Ponca City, Okla. Connection would be made near Ponca City with the existing system extending northeast to Kansas City, Mo., and serving intervening territory.

There are 47 gas wells in the Oklahoma part of the Hugoton gas field and 27 of these producers have never been connected. The proposed Cities Service gas line would draw shut-in supplies from the 27 idle wells and the company's drilling program contemplates 100 new wells on 1,640-acre spacing.

Cost of the gas line the Cities Service wants to build would be in excess of $10,000,000.

More Railroads Allowed To Enter Gas-Line Case

WASHINGTON, D. C.—The Federal Power Commission has authorized the intervention of four new interests in the hearing to be held in Nashville, Tenn., on January 18, on an application by the Tennessee Gas & Transmission Co., Chattanooga, for a certificate of public convenience and necessity to construct and operate a natural-gas pipe line from southwestern Louisiana gas fields to Nashville, Chattanooga, Knoxville, and other Tennessee communities.

The hearing will begin at 9:45 a.m., January 18, in the hearing room of the Tennessee Railroad and Public Utilities Commission, War Memorial Building, Nashville, Tenn.

REFINING

Competition for Butylenes

Bruce K. Brown, assistant deputy petroleum administrator, last week punctured the assertion of farm-bloc spokesmen that "competition" for butylenes between the 100-octane and synthetic-rubber programs threatened to short ration both of these critical national projects. The following extended extracts are from his prepared statement presented January 6 before the Gillette subcommittee of the Senate which is seeking to show that larger portions of the synthetic-rubber program should call for alcohols as the raw material.

THERE has been much discussion and much speculation concerning a so-called "competition" between the 100-octane program and the synthetic-rubber program for petroleum raw materials, particularly butylenes.

There are several closely similar hydrocarbons properly describable as butylenes but for the purpose of this discussion we can divide all butylenes into two groups, that is isobutylene and ordinary butylenes.

There is a temporary competition between the 100-octane program and the synthetic-rubber program for the use of isobutylene. Isobutylene is a hydrocarbon which does not occur in nature. It is not present in crude oil. It is produced along with many other hydrocarbons, by cracking petroleum. Once produced, it becomes available to be converted into butyl rubber or combined with isobutane to produce alkylate, the much-valued ingredient of 100-octane gasoline. I speak of this competition as temporary, because until the butyl-rubber plants are ready to run they don't need isobutylene and after all the butyl-rubber plants and the other petroleum-refining projects which supply their raw materials are completed there will be enough isobutylene to operate both the butyl-rubber and 100-octane plants at scheduled capacity.

Product of Cracking

Butylene, like isobutylene, does not occur in nature and the only feasible source known to me, is the cracking of petroleum. As a matter of fact the same petroleum-cracking processes (whether thermal or catalytic) which produce the isobutylene which I previously discussed, produce butylenes at the same time. If these products were to be used for aviation gasoline alone, both would be reacted with isobutane to produce aviation blending agent (alkylate) or converted to codimer, which, by processes which I need not describe here, also eventually is converted into a substitute for alkylate.

If these products were to be used for synthetic rubber alone the isobutylene and butylene would first be separated; after which the isobutylenes would be converted to butyl rubber and the butylenes would be converted to butadiene.

Numerous Gradations

Actually, all sorts of gradations of these two extreme schemes will come into play in the various refineries. Since there will be more butadiene plants than there will be butyl-rubber plants, the general rule at the refineries serving both the 100-octane and the rubber programs will be to divert isobutylene to 100-octane and butylene to butadiene production.

More specifically, isobutylenes or butylenes available in the refinery gas stream of a petroleum cracking plant in Idaho are not being competed for by the 100-octane program and the synthetic-rubber program. As a matter of fact such a mixture of isobutylene and butylene is of no use to the 100-octane program unless these materials are separated from the rest of the refinery-gas stream, and it takes specially installed equipment to do that. Even if such equipment was installed and operated, the isobutylene and butylene thus produced would still be of no value to the 100-octane program unless one of two things were done, i.e. (1) install special equipment to utilize the materials for the production of 100-octane gasoline or its ingredients, or (2) provide special pressure-type tank cars to convey the materials to the nearest plant capable of using them in the 100-octane program. The story would be the same in the case of synthetic rubber, except that still another complication would arise, namely, the necessity of separating the two materials and using the isobutylene for butyl rubber and the butylene for butadiene.

Butylene Conversions

This brings us down to the actual situation. There are over 55 refinery locations at which 100-octane gasoline is produced or is scheduled to be produced as a finished product ready for use. Out of these 55 plus locations, there are only 11 at which any butylenes there produced will be converted into butadiene. Five of these refineries are the companies making up the Port Neches group., i.e. Atlantic, Gulf, Magnolia, Texas, and Pure. Others are Humble (Baytown), Standard of Louisiana (Baton Rouge), Cities Service (Lake Charles), and Sinclair (Houston). In addition, Pan American and Crown Central, both of whom will produce 100-octane gasoline, will also produce butylenes to be shipped to Sinclair (Houston) for conversion to butadiene.

There are many other refineries which will produce 100-octane but no rubber raw materials and there are many other refineries which will produce butadiene from petroleum materials other than butylene, some of which refineries will produce 100 octane and some will not. None of these other situations appears at all pertinent.

It does not appear to me that there can be such a thing as a real competition for butylenes between 100 octane and rubber except in the very narrow sense that at a given refinery with a limited amount of petroleum material and a limited capacity for producing butylenes, some decision has to be made before equipment for 100-octane gasoline and synthetic rubber is actually installed, as to whether one should make both products at that refinery or concentrate on one product. Having made such a decision, the equipment should be designed accordingly and installed in proper sizes to achieve the end result.

California Refiners May Revamp Joint Operations

LOS ANGELES, Calif.—The Douglas Oil & Refining Co. plant in the Wilmington district, near Los Angeles, has ceased operations. Some refiners who previously engaged Douglas to manufacture their product requirements have been shopping around to make other arrangements. Some of these refiners closed down their own refineries last year in order to reduce operating expense and are therefore reluctant to reopen their own less efficient plants. Tentative plans have been made among refiners left without a source of supplies as a result of the sale of the Douglas plant for removal to Russia, for joint operation of other facilities. This

joint use of facilities will keep operating and refining costs down to a minimum. During the past 10 days, refiners who formerly had Douglas process their crude oil, have been storing crude and moving a part to other refiners on a straight-sale basis pending completion of deals now in process.

All Alcohol-Butadiene Plants to Be Finished Soon

WASHINGTON, D. C.—All of the 11 plants to make butadiene from alcohol are expected to be in operation by midsummer, and the expectation is that they may produce from 25 to 50 per cent more than their rated capacity, the Gillette subcommittee of the Senate was told last week when it reopened its investigations of the synthetic-rubber program.

The witness was Dr. Walter G. Whitman, assistant director of the Chemical Division of the War Production Board, on leave of absence as head of the Department of Chemical Engineering of Massachusetts Institute of Technology. Dr. Whitman's division has charge of alcohol production, and he assured the committee that the program now under way would provide sufficient alcohol for these butadiene plants.

These butadiene plants are rated to produce 20,000 tons of butadiene annually each and Dr. Whitman said that alcohol requirements are being estimated on the expectation that each plant will operate at the rate of 25,000 tons during 1943 and at 30,000 tons during 1944. The first of these plants will start operating this month and one or two additional units will be completed each month with the last one coming in during June.

A progress report on the synthetic rubber operations of Carbide & Carbon Chemicals Corp. was received from W. E. Thompson, vice president of that company, and placed in the record by Chairman Gillette. The company has contracts to produce 220,000 tons of butadiene per year from alcohol, 5,000 tons of coproduct butadiene, and 25,000 tons per year of styrene. Of the butadiene from alcohol, 5,000 tons of coprodduced at plants of the Defense Plant Corp. at Institute, W. Va., and 60,000 tons from DPC plants at Louisville, Ky. The company is also building capacity for DPC near Pittsburgh, Pa., for 80,000 tons, which will be operated by Koppers United Co. The 5,000-ton coproduct butadiene plant is near Charleston, W. Va., and is privately owned by the company.

Standard of Indiana Will Build $13,000,000 Plant

WASHINGTON, D. C.—Consummation of a contract between Defense Plant Corp. and Standard Oil Co. (Indiana), covering facilities for the production of war materials costing $13,000,000 was announced here last week by Jesse Jones, secretary of commerce.

No details were given in the Department of Commerce announcement. It is understood, however, that the contract refers to facilities at the Wood River, Ill., refinery of Standard of Indiana and embraces installations previously covered by a letter of patent.

Golden Bear Completes Solvent-Refining Unit

BAKERSFIELD, Calif.—Golden Bear Oil Co. of Los Angeles, Calif., has completed its furfural solvent-refining unit at the Oildale plant, near Bakersfield. The plant has been under construction for nearly a year and represents an investment of about $500,000.

The Golden Bear refinery has a crude capacity of 2,500 bbl. daily. Manufacturing operations are concentrated on motor fuel, lubricating oils and asphalt.

J. M. Feldman is president of the company and Charles P. Prewett is vice president and general superintendent.

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PIPE LINES

Route for Products Line Is Studied

WASHINGTON, D. C.—A committee has been considering the route to be followed by a products line from Texas to the New York-Philadelphia area. There has been much discussion regarding a proposed route crossing Mississippi, Tennessee, Kentucky and West Virginia, which has been favored by those who prefer not to run the risk of having both the crude-oil line and the products line put out of service at the same time by landslides, washouts at rivers and by damage to transmission lines, as might happen, if the crude and products lines were laid along the same route. However, it has been pointed out that over a period of time the possibility of interruption of service is bound to be no greater for parallel lines than for separated lines. Two separated lines have twice the chances for interruption due to natural causes as two parallel lines.

Operating and construction expenses would be materially less for parallel than for separate lines. The route across Tennessee and Kentucky would be about 35 miles shorter than the one via the Beaumont-Port Arthur area and Bald Knob, Ark., where it would meet the WEP 24-in. line right-of-way.

Skelly Extends Line in Western Kansas

Stringing of pipe has started for the pipe-line organization of Skelly Oil Co. to serve as an extension consisting of 28 miles of 4-in. and 6-in. connecting with the Cunningham, Iuka, Kipp and Jordan pools.

WEP Tests 24-In. Line to Ouachita River

Testing of War Emergency Pipelines, Inc.'s 24-in. crude-oil line from Longview, Tex., to Norris City, Ill., has progressed as far as the Ouachita River. With the installation of additional valves, it is expected that by the end of the week, testing will be done as far as the Saline River near Station 4. Pressure of 650 lb. is held for 3 hours at each testing point. It is reported that so far the blowing of a gasket has been the only trouble encountered.

Pipe washed away at the Mississippi River has been recovered and some work is being done on the west bank preparatory to laying a new line across the river as soon as flood waters subside.

The spreads of Sheehan Pipe Line Construction Co. and Ray L. Smith Construction Co. early this week completed work in Illinois. The only gap now remaining with the exception of the Mississippi River crossing is 1,700 ft. in Missouri which should be finished soon.

Shipments of factory bends are being made to the contractors. Bends are manufactured at the rate of 175 to 180 per day by A. O. Smith Corp. and are shipped in carloads, consisting of 250 bends each.

Construction of five tanks at Longview, Tex., is well under way. At Norris City, there have been delays due to difficulty reported in getting tank builders in that area.

Sections of the War Emergency Pipelines, Inc.'s 24-in. project which have been contracted by O. E. Dempsey Construction Co. and W. A. Bechtel Co. are being handled by an organization known as Bechtel-Dempsey Construction Co. Field offices have been established at Circleville, Ohio; Zanesville, Ohio, and Moundsville, W. Va.

Charles P. Cathers, engineer in charge of the War Emergency Pipelines, Inc., project for Defense Plant Corp., subsidiary of Reconstruction Finance Corp.

Magnolia Joins Systems by Vanderbilt-Placedo Line

Flow of crude oil started January 9 through 15 miles of 6-in. laid by Magnolia Pipe Line Co. between Vanderbilt and Placedo, Tex., which links the Magnolia trunk-line system with the Barnsdall system. It is expected that shipments will be made at the rate of 12,000 bbl. of sweet crude oil daily from the Heyser, Placedo and Keeran pools. Movement of oil has started even though all of the pipe has not yet been lowered in the ditch.

Oklahoma Pipe Line Lays Healdton-Hewitt Link

Between Stanolind Pipe Line Co.'s Healdton, Okla., station and Oklahoma Pipe Line Co.'s Hewitt, Okla., station 10¼ miles of 10-in. pipe will be laid as part of Project 1 for increasing the flow of crude from Texas to the East Coast by existing lines. Oklahoma Pipe Line Co. let the contract to Oil Field Service, Ardmore, Okla.

Oil would be delivered into the 10¼-mile link by the Stanolind pumps at Bowie, Tex. According to Oklahoma Pipe Line Co. plans, a booster station may be installed half way between Healdton and Hewitt.

All material used including pipe and pumping unit is second hand and had previously been in pipe line service elsewhere.

The Stanolind program for looping its system between Graford and Bowie, Tex., is expected to be completed about January 22. Plans call for moving oil into O.P.L.'s link between Healdton and Hewitt on February 1. Shipments received from Stanolind by Oklahoma Pipe Line will be transported through connecting systems to the East Coast.

Shipments will probably begin at less than the normal rate and will be stepped up to the scheduled rate of 10,000 bbl. daily. Because of the problems incident to delivering to two outlets in the Healdton area, oil for OPL may be pumped at certain times during a shorter period at a higher daily rate when the Stanolind system from Bowie, Tex., is engaged solely in moving Project 1 shipments.

Tariff for the movement which is being announced by Humble Oil & Refining Co., the initial shipper, becomes effective January 20.

Stanolind Awaits Approval Of New Looping Program

Application has been made by Stanolind Pipe Line Co. for government permit covering the laying of 8-in. pipe for seven loops. Pipe is to be obtained from salvaged lines in Oklahoma and Texas. The length and location of the loops under consideration are as follows:

Mexia-Lakenon station, 20.09 miles; Lakenon-Cresson station, 20.44 miles; Graford-Bowie station, 25.54 miles. All of the above loops are to be in Texas.

Between Bowie, Tex., and Healdton, Okla., station a 21.42-mile loop is proposed. Two other loops are proposed for Oklahoma: Healdton-Pauls Valley station, 9.76 miles; Hominy-Blake station, 6.94 miles.

Ohio Oil Co. Lays Bible Grove Outlet

Work has started on the laying of an outlet from the Bible Grove, Illinois, pool for Ohio Oil Co. to its Montrose pump station. Previously crude from this field has been shipped by other interests in tank cars.

Devonian Oil Segregation Requires Separate Line

For segregating Devonian crude in order to take full advantage of its gasoline content, Oklahoma Pipe Line Co. has contracted the laying of 15 miles of line, most of which will be 4-in. but some 6-in. will be used. This line will move oil out of the Louden pool, Illinois, to the trunk line of Ohio Oil Co. (formerly Illinois Pipe Line) through which it will be handled in separate batches. Laying of the line has been contracted by Pipeline Service Co., Seminole, Okla.

Storage in East Texas Is Used for WEP Needs

WASHINGTON, D. C.—To prepare for shipments through the War Emergency Pipelines, Inc., 24-in. line, storage of major companies is utilized in the East Texas area. The principal facilities in this area are as follows:

Large Tanks at Field Stations in East Texas

	Sizes of tanks			
Company—	55,000 bbl.	64,000 bbl.	80,000 bbl.	Total bbl.
Humble	4	15	1	1,260,000
Texas	..	..	14	1,120,000
Magnolia	2	..	8	750,000
Tidal	12	..	..	660,000
Shell	1	..	6	535,000
Atlantic	7	..	1	465,000
Houston	4	..	3	460,000
Sun	1	..	4	375,000
Pan American	..	..	1	320,000
Atlas	..	..	3	240,000
Empire	..	..	3	240,000
General Crude	4	..	..	220,000
Jones & O'Brien	2	..	1	190,000
Gulf	3	..	..	165,000
Arkansas Fuel	2	..	..	110,000
Texas Empire	..	..	1	80,000
Total	42	15	49	7,190,000

PIPE-LINE PERSONALITIES

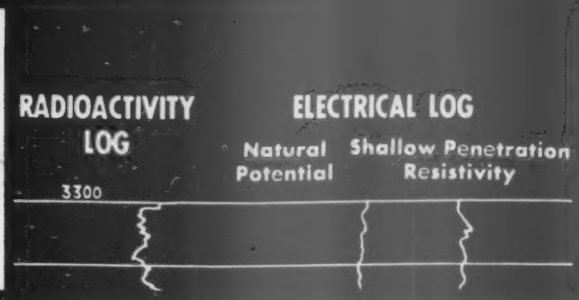
CAPT. E. W. KRUG

CAPT. E. W. KRUG, engineering petroleum detachment of the U. S. Army Engineers entered the service from the position of division pipe-line superintendent of Pan American Pipe Line Co., Houston, Tex.

He was born at Russell, Kans., and grew up on a farm. About 1926 he was employed as a laborer for Sinclair Crude Oil Purchasing Co. by Roy Thompson, now general superintendent, Stanolind Oil Purchasing Co. He worked his way up through the ranks as pipe liner, truck driver, tank-car loader, field gager, gang pusher, connection foreman, tank construction foreman, district gager and chief gager. Most of the time he was with the Sinclair organization, and later with Stanolind after the reorganization, he was engaged in the company's operations in western Kansas, Oklahoma, and Texas. In this period he was located at Gorham and McPherson, Kans., Hominy and Healdton, Okla., and Mexia, Tex.

Shortly before being transferred to the Pan American organization in 1934 to be chief gager in the Anahuac, Tex., area he was district gager for Stanolind at the Leeville, Louisiana, pool where crude was forwarded by barge to Destrahan, La. At Anahuac he handled shipments to the Pan American refinery at Texas City.

For years he has been known as a good salt-water fisherman. Friends of Captain Krug say that he knows how to drive hard to get results wherever he is. He has a reputation for being a good fighter.



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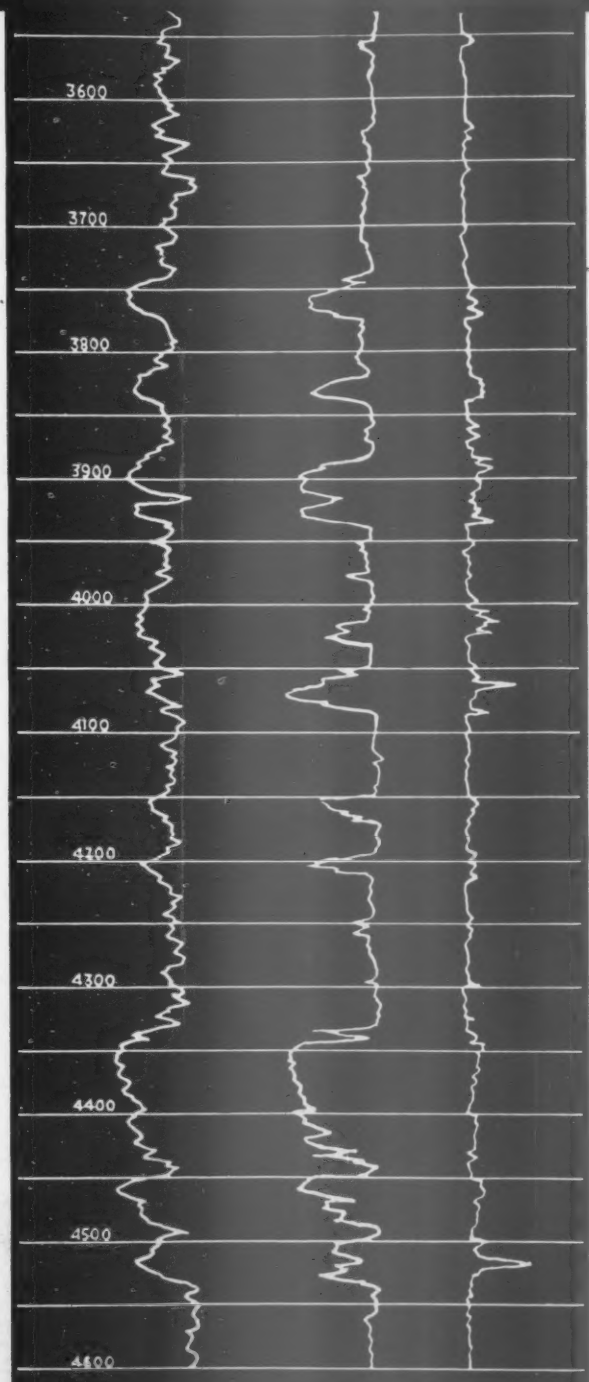
IN FLUID OR DRY

Radioactivity Well Logging



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Exploration and Drilling

Week's Highlights

DURING 1942 the majority of the discoveries made were either in deeper sands on and around known producing structures or were fields which followed pushing exploration a little farther out into basins from production on the flanks. The discoveries reported during the first complete week of 1943 follow the same general pattern. In Oklahoma another sector of the Slick-Wilcox area in Creek County has proved productive and another pay has been found in the old Velma pool in Stephens County. In East Texas, a deep well in the Nacogdoches area has made a good flow of gas from a horizon in the Travis Peak (p. 83). This is the oldest producing area in Texas, first oil having been reported in 1865 from shallow wells. In Pike County, eastern Kentucky, (p. 90) a new oil pool has been opened near the Big Sandy gas field which is east of formerly known oil production, with the exception of the discovery in Lee County, Virginia, last year. As this is the second discovery in this belt which was formerly thought too far east for commercial oil production, considerable activity should follow.

COLORADO: A wildcat in Weld County has been abandoned after failing to show commercial production during tests of saturated zones in the Muddy sand (p. 79).

NORTH CENTRAL TEXAS: A new Caddo lime field has been opened 2 miles southwest of the Hoefle pool and a test east of Jacksboro has recovered a showing of gas. A wildcat near Jermyn encountered a stain of oil in the Bryson sand and is drilling ahead (p. 88).

CALIFORNIA: Failure of operators to submit an acceptable operating plan has caused a suspension of production in the Coles Levee field during the month of January. Preparations are under way to drill a second well in the new East Strand field and derrick is being built for the initial test in the Gilmore Island section of Los Angeles (p. 78).

OKLAHOMA: A new producing zone has been opened in the Velma area of Stephens County. A wildcat east of the Frederick pool and another in the Slick-Wilcox area of Creek County tested oil on initial tests and are showing for pool openers (p. 75).

PERMIAN BASIN: A new producing area for the northern Permian basin has been opened by a Gaines County wildcat. Location has been made for a deep Ellenburger test in the Cedar Lake field (p. 81).

SOUTHWEST TEXAS: A wildcat in Jim Wells County, southwest of Orange Grove, has been completed as a gas well to open a new field for the area (p. 82).

KANSAS: A Saline County wildcat was reported making 6 bbl. of oil an hour from the Mississippian chat to open a new field 5 miles north of the Roxbury field. An increase in activity is expected with many new locations being staked during the first week of the new year (p. 83).

TEXAS GULF COAST: The first pool in the upper Gulf Coast to be opened this year has been discovered by a Jefferson County wildcat. Gas-distillate odor has been encountered in a Harris County wildcat and operators are preparing to make a drill-stem test (p. 76).

ILLINOIS: Clean oil was recovered on a drill-stem test of the Devonian lime in a well in the Patoka field of Marion County and a test in Wayne County has extended the Golden Gate pool ½ mile east (p. 87).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended January 9, 1943)

	Oil	Gas	Dry	Total	Footage	Comp. to date 1942	Comp. to date 1941
N. Y., Pa., and W. Va.	41	7	1	49	88,317	49	219
Ohio	1	4	3	8	16,480	8	59
Indiana	1	0	1	2	924	2	36
Kentucky	1	0	0	1	2,304	1	30
Illinois	23	1	21	45	109,903	45	137
Michigan	4	0	7	11	33,565	11	41
Kansas	11	0	13	24	81,602	24	76
Nebraska	0	0	2	2	6,054	2	0
Missouri, Iowa	0	0	0	0	0	0	0
Oklahoma	6	2	13	21	56,915	21	51
Texas:							
North Central Texas	9	0	14	23	82,650	23	74
West Texas	10	0	3	13	63,786	13	81
Texas Panhandle	2	0	2	4	11,792	4	32
Eastern Texas	2	0	1	3	17,887	3	27
Texas Gulf Coast	2	1	3	6	38,545	6	44
Southwest Texas	5	1	11	17	77,306	17	59
Total Texas	30	2	34	66	291,976	66	317
North Louisiana	2	0	0	2	12,014	2	37
Louisiana Gulf Coast	8	0	0	8	79,136	8	46
Total Louisiana	10	0	0	10	91,150	10	83
Arkansas	2	0	0	2	12,890	2	4
Mississippi and Southeast	0	0	0	0	0	0	14
Montana	3	0	0	3	9,027	3	8
Wyoming	3	0	0	3	13,091	3	3
Colorado, Utah	0	0	1	1	7,006	1	0
New Mexico	2	0	0	2	7,530	2	8
California	4	0	0	4	17,330	4	31
Total United States	142	16	96	254	848,064	254	1,115
Total previous week	155	28	99	282			
Week ended Jan. 10, 1942	404	44	123	571			

Geology of Northwest Wilmington and Torrance Fields, California

by W. R. Cabeen and A. L. Hunter**

THE Wilmington oil field is a transversely faulted anticlinical nose plunging to the northwest. This transverse faulting has divided the field into structural blocks and has been responsible for its extension to the northwest into the Harbor City area. The faults form sharp lines of demarcation as to well productivity, oil gravities, edge-water limits, and gas-oil ratios.

Four productive zones have been discovered in the townlot area of Northwest Wilmington. These are (in descending order) the Tar and Ranger (Pliocene), and the Terminal and Ford (Miocene).

The Tar zone is of middle Repetto age and is approximately 100 ft. thick. The zone contains very heavy oil (13°), as its name implies. About 80 per cent of the zone is sand. The productive limits are not as extensive as the underlying Ranger and upper Terminal zones, only in the southeasterly portion of the area under discussion, that is, Block 1 and the uppermost structural portion of Block C (Fig. 1). In the remainder of the area it is wet and nonproductive. The D_1 electrical log point marks the top of the Tar zone. Above this highest productive zone of the Wilmington field lies approximately 750 ft. of upper Middle and upper Repetto, composed of light to dark brown, silty and sandy shales, thin beds of siltstone and sandstone (shells), and sand. Overlying the Repetto unconformably is found upper and middle Pico of upper Pliocene age which varies from 1,000 to 1,300 ft. in thickness and is mainly arenaceous with streaks of blue gray micaceous shales in the upper part and light brown silty to sandy shale in the lower portion. Overlying Pico formation unconformably are the poorly consolidated Pleistocene and Recent deposits which are composed of surface soil, sand, gravel, boulders, and arenaceous blue clays, which vary in thickness from 600-800 ft.

To date there has been no accurate or satisfactory presentation of the structural and stratigraphic relationships of the productive zones of Torrance and Northwest Wilmington. This area represents the most promising and practically the only area of any size that is undrilled and still relatively undeveloped in the Los Angeles Basin. This structural picture, together with a discussion of the recovery per acre to be expected, will be beneficial to its further development, which is necessary in aiding in alleviating the fuel-oil shortage in our war program.

The Ranger zone (lower and middle Repetto-lowermost Pliocene) blankets the entire field and is the most extensive of the producing zones. The F_1 point on the electric logs marks the top of the zone, the G point the bottom. The average thickness of the zone is 240 ft. This zone is immediately above the Pliocene-Miocene contact and due to the existence of an unconformity between the two geologic formations is variable in lithology immediately above this contact. The Ranger zone overlying this unconformity is distinct in lithology from the upper Terminal zone underlying it. It is composed of light greyish brown foraminiferal shales interbedded with medium-textured to fine silty black unconsolidated sands. The largest grain size and best sorting occurs at the top of the zone, whereas the lower portion of the zone is more silty and less well sorted. The Ranger oil averages 16° in gravity and is a black oil with a tarry odor.

The upper Terminal zone underlying the Ranger zone is of upper Miocene age, and, as mentioned, is separated from it by an unconformity. The approximate top of the Miocene is marked by the "Poker Chip" shale, which has for many years been used as a marker for the top of the Miocene in the west portion of the Los Angeles Basin. According to Wissler*, this horizon comes approximately 30-40 ft. below the Miocene-Pliocene contact. Thin layers of impure diatomite are associated with this finely laminated (platy) light to dark brown "Poker Chip" shale. The top of this lithologic marker is the G point on the electric log. The Terminal zone is characterized by semiplaty to platy brown to black fossiliferous shales interbedded with medium to coarse grained well sorted brown quartzitic oil sand. It is distinct from the Ranger by its characteristically lighter-colored higher-gravity and better-sorted oil sands. The gravity range of the oil from this zone is from 18° to 20°.

*Consulting geologists and petroleum engineers, Los Angeles, Calif.

*Wissler, Stanley G., "Stratigraphic Formations of the Producing Zones of the Los Angeles Basin Oil Fields," State of California Department of Natural Resources, Division of Mines Bulletin 118, Part II, August 1941.

DAILY AVERAGE PRODUCTION FOR WEEK

	Jan. 9 crude oil	Jan. OPC quota all oils	Jan. 2 crude oil
Arkansas	75,200	78,300	75,000
California	771,250	815,000	774,950
Colorado	6,400	7,000	6,660
Eastern fields	93,000	107,600	87,200
Illinois	255,000	272,600	247,000
Indiana	15,750	17,200	15,000
Kansas	265,400	310,000	288,350
Louisiana	339,800	347,500	316,150
North Louisiana	*92,700*	.....	*93,150*
Louisiana Gulf Coast	*247,100*	.....	*223,000*
Michigan	56,700	63,700	59,300
Mississippi	64,300	50,000	56,850
Montana	21,790	24,700	21,805
Nebraska	3,000	3,400	2,900
New Mexico	99,000	105,300	99,100
Oklahoma	349,800	400,800	354,000
Texas	1,328,800	1,426,800	1,376,350
East Texas	*327,600*	.....	*350,600*
West Texas	*200,300*	.....	*206,750*
North Central Texas	*136,200*	.....	*138,600*
East Central Texas	*101,600*	.....	*101,300*
Texas Panhandle	*83,300*	.....	*90,500*
Texas Gulf Coast	*403,600*	.....	*421,550*
Southwest Texas	*66,200*	.....	*67,050*
Wyoming	87,640	94,500	89,240
Total United States	3,832,830	4,124,200	3,869,855
Total production Jan. 1-Jan. 9, 1943			34,569,520 bbl.
Same period last year			37,603,360 bbl.

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**This estimate is based on a South Texas high octane crude oil field where the daily allowable is approximately 20 bbls. It is figured that 15% of the crude is suitable for 100+ octane aviation gasoline. Regular processing gives an estimated finished production of 126 gallons of aviation gasoline.*

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The Ford zone is only being produced in the southeastern portion of the area under discussion. This area and the wells producing from it are designated on the accompanying maps. The Ford zone is of upper Miocene age and is approximately 700-800 ft. thick. The zone occurs between electric log markers Am and AW. The gravity of the oil ranges between 28° and 32°.

Lower Terminal and Ford zone possibilities have not been fully explored throughout most of the area under discussion. In the light of this study the writers believe the possibilities are enhanced, as certain indications are revealed which suggest areas suitable for testing lower reservoirs.

In the Torrance field the Main zone is roughly equivalent in age to the upper Terminal of Northwest Wilmington. The other producing zone of Torrance, the Del Amo, is roughly equivalent to the lower middle and upper-lower portion of the Ford zone of the Wilmington field proper or the deep De Soto zone of Long Beach (Signal Hill).

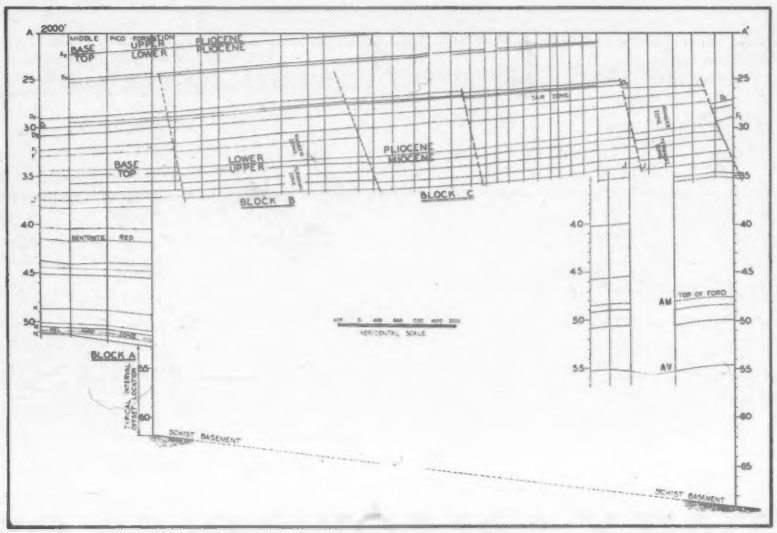

Fig. 1—Cross-section of Northwest Wilmington-Torrance fields based on electric logs

Structure and Stratigraphy

The Torrance structure is a complex structural nose plunging in a general southeasterly direction conforming for the most part to and dominated by an irregular nose or schist ridge in the basement schist. As the Torrance schist structure, rising in a northwesterly direction, approaches the ocean at Redondo (approximately 7 miles west of the Harbor City area), the strike swings in a more northerly direction and in general follows the coast line with irregular relief toward Playa del Rey. The fact that the basement schist played a dominant part in the formation of the Torrance structure is shown in the thickening and change in sedimentation in relation to the schist relief. The most marked effects, as would be expected, are to be found in the lower part of the section nearest the basement. Later folding after deposition undoubtedly accentuated the original schist influenced relief to varying degrees throughout the structure of the Torrance nose. The local and irregular development of the Del Amo zone in the Torrance field reflects these effects on accumulation. Change in sedimentation from the flank areas over the crest has also been instrumental. It is interesting to note that Del Amo production in general is limited to the southwest flank of the Torrance nose while the Main zone production is confined chiefly to the opposite limb or northeast side of the structure. Later folding is indicated by the fact that although closure dies out upward in the section away from the basement relief, it does not do so as rapidly as would be expected if closure was entirely due to thinning over basement relief and compaction. Above an unconformity separating lower Pliocene (Repetto) and upper Pliocene (Pico) the upper and middle Pico and Pleistocene dip and thicken westward in a direction opposite to the southeasterly plunging and thickening beds of lower Pliocene and upper Miocene overlying the schist.

Wilmington Nose

The northwesterly plunging Wilmington nose has by normal and horizontal shear faulting extended production northwestward into the vicinity of the Torrance Harbor City area. Here the southeasterly plunging Torrance structural nose and the northwesterly plunging Wilmington nose overlap en echelon, the Torrance nose dying out southeasterly into the flank of the Wilmington fold and the Wilmington nose dying out northwestwardly into the flank of the Torrance fold (Fig. 1).

Thickening, off the Torrance structure, opposite to the plunge of the Wilmington structure causes the Wilmington northwesterly plunging structural closure to die out at depth and reverse in direction to a southwesterly plunge. This reversal at depth due to thickening limits the saturation in the upper Terminal in the Vesta area of Northwest Wilmington (Fig. 2). This reversal of plunge at depth due to thickening, off the Torrance schist high, opposite to the northwesterly plunge of the Wilmington structure in the Harbor City area is overcome in the Townlot area of Wilmington in the vicinity of the Townlot Ford zone area and results in closure. A thickening of 1,400 ft. in a southeasterly direction, opposite to the plunge of the Northwest Wilmington structure and off the Torrance schist high, in a distance of 2 miles is shown on the accompanying structural cross-section. The greatest closure effect of plunge opposite to thickening is of course most marked at depth where thickening is greatest. The writers have contoured this portion of the Townlot area (Fig. 3) on one of the lowest electric log points on the Ford zone, the AV point. This shows some complete closure in all directions at this depth below the Ranger and Terminal zones which are northwesterly plunging with closure (excluding minor faulting) in but one direction. This reversal of dip opposite to the plunge due to thickening against plunge, although of relatively small effect in the Ford zone, has produced a small closure and terrace effect which probably explains the unexpected good Ford production in the Townlot Ford zone area so far down plunge, with production comparable to the "up structure" Ford zone production. In contouring on the AV point it was noticed that on the electric logs the thickening effect was partially masked by the arbitrary designation of the AV point on a lower point north of Anaheim and a higher point south. This closure shown in the lower portion of the Ford zone undoubtedly increases with depth. It is the writers' belief that the section below the Ford zone in this area contains closure which should offer very promising production possibilities. The Royalty Service B7 well in the Harbor area and the Tide Water Associated Oil Co. 1 Banning on the north flank of the field are the only wells that have explored the section down to the schist in this area. As shown by contour map and section, they would be off the previously mentioned high. It is to be noted that Royalty Service B7, although much higher in the upper zones than the wells in the Townlot Ford zone area (because it is high on the plunging nose) would be low in the zones below the Ford zone. This would explain the poor

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showings cored by this well in the section below the Ford zone.

Faulting

Faulting consists mainly of horizontal shears crossing the strike of the plunging nose of Northwest Wilmington. These faults show a very small apparent vertical displacement, however, their effect on production is marked. Crossing the strike of the plunge of the nose as they do, they effect local closures which are in part responsible for the extension of Northwest Wilmington. Immediately in the northwesterly down plunge side of these faults a marked increase in the production and decrease in cut (due to change in edge-water limits) of the wells in comparison to those on the immediate up plunge side of the fault is to be noted. These faults also form sharp lines of demarcation as to oil gravities and gas-oil ratios. Such a sharp demarcation due to faulting is especially noteworthy in cases where the faults do not show a vertical offset of over 10-12 ft., as in this area. The probable explanation of this is that the greatest amount of movement was horizontal. On a flat structure of this kind with the faults cutting across the folds obliquely a horizontal movement of several hundred feet would only produce a very small vertical displacement, as is found. Horizontal movement, as the principal movement, is also indicated by a difference in thickness of the sediments on the two sides of the faults, the probable explanation of which is horizontal movement of the side showing the greatest thickness from one of the flank areas of the fold. The sediments thicken rapidly down dip on the flanks to the northeast and southwest.

Conclusion

The Torrance and Wilmington fields are believed by the writers to be dynamically related. Torrance, as previously mentioned, is a schist-dominated structure formed on a southeast plunging schist ridge. This ridge projected eastward passes immediately north of the north flank of Wilmington. The Wilmington structure is more nearly a true fold, forces producing it and instrumental in adding relief and faulting to the Torrance structure are believed to have been from the south or southwest. It is believed that the Torrance schist ridge during this folding acted as a buttress (equivalent to an opposite force) against which the Wilmington fold was formed. The cross-shears which divide the structure into blocks were formed toward the end of the folding by the forces from the south or southwest. The true normal or gravity faults (not those resulting from horizontal movement) represent the adjustment phase of movement.

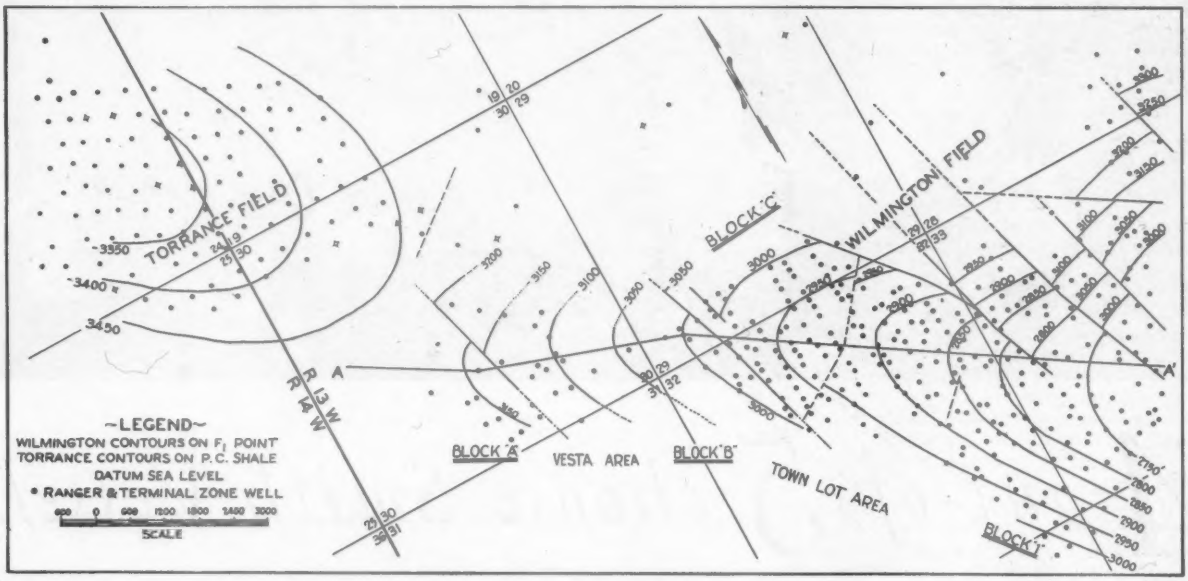
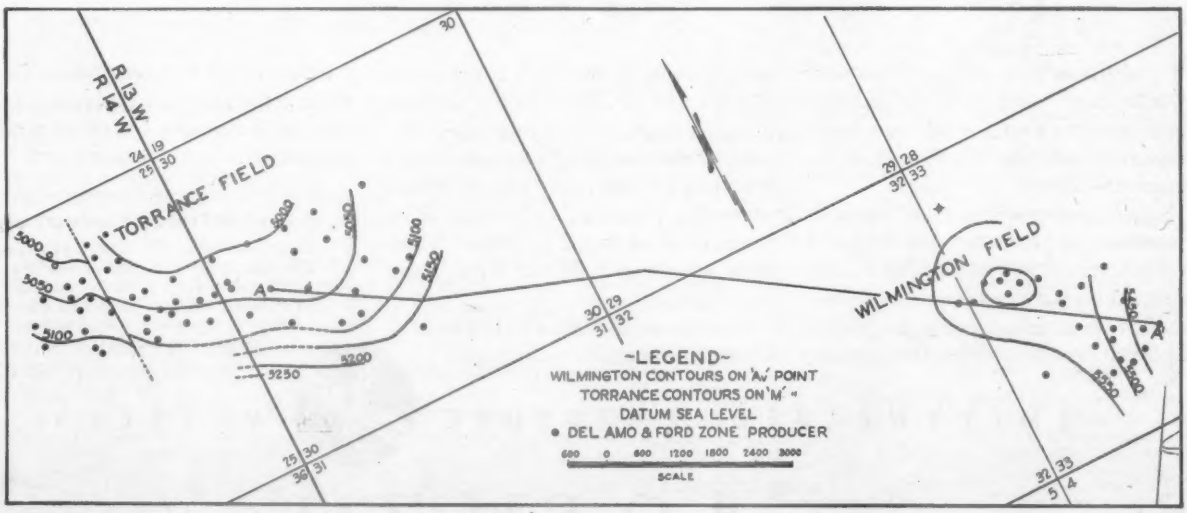


Fig. 2 (top). Fig. 3 (below)



OKLAHOMA FIELD REPORT

Skelly Opens Additional Sand Zone in Velma Pool

IN the Velma area of Stephens County, Skelly Oil Co. opened another producing zone at 1,337-1,470 ft. in sand. The well, 1-C Frensley, SW NE SW 25-1s-5w, pumped 113 bbl. of 32-gravity oil a day, a comparatively good well for this pool. Total depth was 1,495 ft.

Other prospective pool openers in the process of completion included Kerlyn Oil Co.'s 1 Hinton, NE SE SE 35-2s-17w, 3 miles east of the Frederick pool and southeast of the town of Frederick. The well tested 30 bbl. of oil a day after the first shots in casing at 2,680-95 ft., at the base of the Cisco. Additional perforations were made at 2,924-35 ft. but results were pending cleaning out operations. Total depth is 3,243 ft.

The Texas Co.'s 1 Harrison, NE SE NW 25-4n-11w, a stratigraphic test drilled to 4,261 ft. but which was expected to make a small gas well in a shallow zone, logged the following: Viola lime 1,150 ft., Simpson sand 1,890 ft., McLish 2,555 ft., Oil Creek 3,045 ft., and the Arbuckle at 4,116 ft. The hole was plugged back to 1,226 ft., perforated at 1,150-60 ft., washed and swabbed dry but had not shows.

In the Slick-Wilcox area of Creek County, Seismograph Service Corp. 1 Belford, NW SW SE 26-15n-10e, was drilling below 3,151 ft. after making an estimated 40 to 50 bbl. of oil a day. Sand was found from 2,054-2,200 ft., Mississippi lime at 2,705 ft., and Misener at 2,993 ft. The well sprayed oil with about 1,500,000 cu. ft. of gas.

A failure in the second well to be completed at the North Liberty pool had operators wondering of the field was to become a graveyard of abandoned holes in the same manner as at Liberty. Magnolia Petroleum Co. 1 Veroneau, SE NE NW 10-22n-2e, found the Wilcox dry at 4,409 ft. Total depth was 4,457 ft. The test is a southwest offset to the discovery, 1 Dailey, which was completed for 1,027 bbl. in Wilcox at 4,369-80 ft.

OKLAHOMA COMPLETIONS

Wildcats

Comanche County: Texas 1 Harrison, NE SE NW 25-4n-11w, dry, T.D. 4,261 ft., Viola 1,150 ft., Simpson sand 1,890 ft., McLish 2,555 ft., Oil Creek 3,045 ft., Arbuckle 4,116 ft.

McIntosh County: McNutt & Young 1 Dorr, SE SE 18-11n-17e, dry, T.D. 1,656 ft., sands 1,185 ft., 1,552 ft., 1,628 ft.

Okfuskee County: Mid-Continent 1 Meinholtz, SW SW SW 18-12n-7e, dry, T.D. 4,500 ft., Bartlesville 3,202 ft., Cromwell 3,910 ft., Mayes 4,200 ft., Hunton 4,368 ft.

Pottawatomie County: Phillips 1 Burgess, SE NW 22-6n-5e, dry, T.D. 3,130 ft., Earlsboro 2,890 ft., Dutcher 3,013 ft.

Sequoyah County: Western Oklahoma Gas 1 Nix, NW NE SW 1-10n-24e, 3,000,000 cu. ft. gas, sand 1,430-1,560 ft., T.D.

Stephens County: L. W. Winkler 1 Gentry, SW SW SW 4-1s-5w, dry, T.D. 2,510 ft. in sand.

Velma area, Stephens County: Skelly 1-C Frensley, SW NE SW 25-1s-5w, pumped 113 bbl., sand 1,337-1,470 ft., T.D. 1,495 ft.

Fields

Cement, Caddo County: Ohio 15 Wagner, Acct. 2, NW SW SW 12-5n-9w, pumped 170 bbl., sand 3,313-22 ft., T.D. 3,370 ft.

Cumberland, Marshall County: Pure 1 Rowland-115, SE NE NE 19-5s-7e, flowed 193 bbl. in 4 hr., pay 5,975-6,061 ft., T.D. 6,063 ft.

Duncan district, Stephens County: Roy Lee 1 Wallace, SW SE 21-1n-8w, dry, T.D. 5,350 ft.

Liberty North, Noble County: Magnolia 1 Veroneau, SE NE NW 10-22n-2e, dry, T.D. 4,457 ft., Wilcox 4,409 ft.

Loco, Stephens County: J. E. Jackson 1-B Massey, SW NW NW 8-3s-5w, pumped 43 bbl., sand 1,100-20 ft.

Miscellaneous

Creek County: C. O. Buckles 2 Isles, NW NE SE 1-19n-9e, pumped 5 bbl., pay 2,059-87 ft., T.D. 2,090 ft.

Okmulgee County: J. R. Allen 1 Hill, SE SW 21-14n-12e, dry, T.D. 1,704 ft., Booch 1,410 ft.

D. W. Howard 4-A Trumbo, NW SE NE 18-14n-15e, dry, T.D. 1,300 ft.

J. H. Ribold 1 Jones, SE NW 6-15n-12e, 1,000,000 cu. ft. gas, sand 1,201-28 ft.

Osage County: A. G. Oliphant 4, NE SW SW 34-22n-7e, dry, T.D. 3,157 ft., Arbuckle 3,103 ft.

Sagamore 415, NE SW 2-27n-10e, dry, T.D. 1,917 ft.

Pawnee County: Lake Oil 1-A Sallee, NE SW SE 32-20n-6e, dry, T.D. 3,447 ft., Wilcox 3,413 ft.

Tulsa County: Continental 4 Key, NE NW 9-21n-13e, pumped 9 bbl., 1,281-98 ft.

Continental 5 Key, SW NE NW 9-21n-13e, repressure well, T.D. 1,302 ft.

MICHIGAN

First 1943 Producer Completed As Large Flowing Well

SAGINAW, Mich. — Oil men hoped it was a good omen for Michigan fields this year when Sun Oil Co. brought in the first producer for 1943 in Osceola Township, Osceola County, for an estimated natural initial flow rate of 50 bbl. per hour. A 500-bbl. output was reported from the hole in the first 5 hours at 3,723 ft. The well is 3 Wilcox in Section 27.

Completions reported last week totaled 10, 6 of them being dry holes. One of the producers is Sun Oil Co. 1 Hay on the east side of the old Buckeye field in Hay Township, Gladwin County. It was swabbing 40 bbl. a day, being acidized at 3,640 ft. In Ogemaw County and old well produced 15 to 25 bbl. a day on pump when Alvin Weber & Associates completed F-1 State in Section 33, Foster Township, at 4,268 ft. The hole was plugged back from an unsuccessful deep test that reached 5,367 ft Weber was the leading developer of the state's big Reed City field and sold his interests there last spring to Ohio Oil Co.

A small Trowbridge-Allegan well and another in Osceola-Osceola were the other producers.

The state Conservation Department reported permits issued in 1942 totaled 570 in announcing 9 more drilling franchises for operations in seven counties; 3 in Van Buren, the rest to Clare, Gladwin, Kent, Montcalm, Oceana, and Ottawa.

The first 1943 auction of lease rights on state lands may be set for February. Decision of offering several thousand acres was to be made January 12 at the Conservation Department meeting in Lansing.

MICHIGAN COMPLETIONS

Allegan County, Trowbridge Township: P. S. Anheuser 2 Tripp, NE NE SE 19-1n-13w, pumped 40 bbl. and salt water, acidized, T.D. 1,347 ft.

Arenac County, Deep River Township: Don Rayburn 1 Miscisin, C SW SE 30-19n-4E, dry, T.D. 3,127 ft.

Don Rayburn 1 Lucas, C NE SW Sec. 30, dry, T.D. 3,040 ft.

Gladwin County, Hay Township: Sun Oil Co. A-1 State-Hay, SW NW NE 21-18n-1e, swabbed 40 bbl., acidized, T.D. 3,640½ ft.

Jackson County, Blackman Township: Ohio Oil Co. 1 Taylor, C NE NE 8-2s-1w, wildcat, dry, T.D. 1,956 ft.

Lake County, Pinora Township: Pinora Development Co. 1 Wilder Land Co., C N½ NE NW 9-11n-11w, wildcat, dry, T.D. 3,758 ft.

Ogemaw County, Foster Township: Alvin Weber & Associates F-1 State, NW SW NW 33-24n-2e, pumped 15 to 25 bbl., acidized, T.D. 4,286 ft., P.B. from 5,367 ft.

Osceola County, Osceola Township: Sun Oil Co. 3 Wilcox, C N½ NW SW 27-18n-8w, flowed 300 bbl. natural first 5 hr., T.D. 3,723 ft.

Ottawa County, Polkton Township: Rex Oil & Gas Co. 1 Visbick, NE NW NE 9-8n-

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LOUISIANA GULF COAST

St. Landry Parish Discovery Is Deepest Well in Area

NEW ORLEANS, La. — Gulf Refining Co. 1-E Haas-Hirsch, 3 miles southwest of Krotz Springs, in St. Landry Parish, for weeks recognized as a gas and distillate discovery, now definitely rates as one with its completion at total depth of 11,398 ft., plugged back to 9,327 ft. The well flowed 358 bbl. of 50.2-gravity distillate through 5/16-in. choke, with perforations at 9,316-26 ft. It is the deepest wildcat yet drilled in that area and is on a 3,000-acre block in 21-6s-7e, owned by Gulf.

The Small Discorbis was logged at 6,510 ft., Large Discorbis 6,533 ft., Meogypsina 6,563 ft., Heterostegina 6,624 ft., Heterostegina Common 6,685 ft., Lepidocyclia Colai 6,846 ft., Marginulina Howei 7,183 ft., Flat Marginulina 7,376 ft., Liebussella 8,562 ft., Nodosaria Blanpiedi 8,714 ft., Noniona Struma 8,743 ft., Marginulina Texana 8,987 ft., Cirstelerellia Vicksburgensis and Bulimina Jacksonensis 9,571 ft., Moody Branch 10,120 ft., Eponides Yeguensis 10,148 ft.

A blowout at 8,760 ft. is delaying completion of Jack W. Frazier 1 Sweet Lake Oil & Land Co., in 12-12s-7w, a Stanolind farmout in the Chalkley district of Cameron Parish. A high-pressure gas sand was penetrated at 8,715-45 ft. The operator is reported to have recovered ½ gal. of 41.4-gravity oil from the blowout. The hole bridged over, and the crew has been trying to clean out the hole to resume drilling.

No show was reported from an electric survey of American Republics Corp. 1-X Lutcher Lumber Co., 3-6s-13w, in Beauregard Parish. This test, north of the Bancroft field, topped the Wilcox at 9,685 ft.

George H. Echols 1 Kessler & Sternfels, in the Napoleonville area of Assumption Parish, cemented 7-in. casing at 9,170 ft. and was preparing to perforate at 9,045-65 ft. The hole, bottomed at 10,467 ft., is said to have pieced a 17-ft. sand section indicating promise of a new field. The test is on the northeast flank of the dome, on a small tract farmed out by Tide Water.

Seven field wells were completed in the Louisiana Gulf Coast area during the week, all of them producers.

LOUISIANA GULF COAST COMPLETIONS

Fields

Garden Island Bay, Plaquemines Parish: Texas 59 State-Garden Island Bay, 10S-23s-32e, 146 bbl. through ⅛-in. choke, T.P. 725 lb., gas-oil ratio 536, perf. 5,364-5,430 ft., T.D. 6,896 ft.

Neale, Beauregard Parish: Atlantic 3-E Rice Land & Lumber Co., 33-3s-11w, 202 bbl., through 10/64-in. choke, T.P. 1,375 lb., gas-oil ratio 1,941, perf. 10,974-11,004 ft., T.D. 11,602 ft., P.B. 11,474 ft.

Pine Prairie, Evangeline Parish: Humble 1 R. D. Guillory, 36-3s-1w, 206 bbl. through 9/64-in. choke, T.P. 1,125 lb., gas-oil ratio 962, perf. 7,530-38 ft., T.D. 8,781 ft., P.B. 7,560 ft.

Raceland, La Fourche Parish: Amerada 5 Mrs. J. P. Moore, 34-15s-19e, 226 bbl. through ⅛-in. choke, T.P. 1,525 lb., gas-oil ratio 480, perf. 8,910-22 ft., T.D. 9,350 ft.

Venice, Plaquemines Parish: Tide Water et al 20 Buras Levee district, 169 bbl. through ⅛-in. choke, T.P. 1,700 lb., gas-oil ratio 1,115, perf. 10,975-11,035 ft., T.D. 11,402 ft.

Ville Platte, Evangeline Parish: Continental 10 N. H. Hirsch, 212 bbl. through 10/64-in. choke, T.P. 1,050 lb., C.P. 2,300 lb., gas-oil ratio 372, perf. 10,238-48 ft., T.D. 10,315 ft., P.B. 10,250 ft.

West Cote Blanche, St. Mary Parish: Texas 16 State-West Cote Blanche Bay, 16s-7e, 146 bbl. through ⅛-in. choke, T.P. 790 lb., gas-oil ratio 506, perf. 8,440-65 ft., T.D. 9,392 ft., P.B. 8,566 ft.

Wildcats

St. Landry Parish: Gulf 1-E Maas-Hirsch, 21-6s-7e, 3 mi. SW of Krotz Springs, 358 bbl. 50.2-gravity distillate through ⅛-in. choke, T.P. 2,750 lb., gas-oil ratio 16,100, perf. 9,316-26 ft., T.D. 11,398 ft., P.B. 9,327 ft., discovery well.

TEXAS GULF COAST

Jefferson County Wildcat Opens First Pool of Year

HOUSTON, Tex.—Glenn H. McCarthy, Houston independent operator, brought in the first pool opener of the upper Gulf Coast for 1943 with his 1 Hankamer-McLean, 2 miles northwest of the Stowell field, in the Lopez Survey, Jefferson County. On a potential test the discovery flowed 486 bbl. of 36-gravity high-octane oil through 11/64-in. by 6-in. positive chokes. Tubing pressure was 1,325 lb., casing pressure 1,450 lb., and gas-oil ratio 525:1. The hole was drilled to 8,622 ft. and plugged back to 7,850 ft. Casing was perforated at 7,826-34 ft. The well, in the Winnie area, is classed as one of the best completed in the upper Gulf Coast territory in months. It is said to have logged about 150 ft. of sand.

Texas Co. has staked location for a well in the new field. It is 1 Steele, on the 40 acres offsetting the discovery on the west, in the center of the SW Section 16, in the Koch subdivision of the Lopez Survey, Abstract 37.

The Winnie area long has been of interest to prospectors, and three dry holes have been drilled in it in the last 3 years. Earl Hankamer and the Navarro Oil Co. recorded the first failure, northeast of the McCarthy discovery, in the W½ NE Lot 17, Lopez Survey. It went to 8,800 ft. Hankamer et al tried again 2 miles east of the first hole. This test was abandoned at 9,266 ft. Similar experience attended the third attempt, on Lot 100, which went to 9,260 ft.

Among Gulf Coast wildcats closely watched is O. W. Killam et al 1 M. A. Dodd, 6 miles north of Addicks in W.C.R.R. Survey 13, Harris County. It has tested a gas-distillate odor, and as the week closed the operator was preparing to make a drill-stem test. The well, bottomed at 6,581 ft., topped the Heterostegina at 3,110 ft., Textularia Warreni at 4,746 ft., and Textularia Hockleyensis at 5,461 ft. It was intended to drill ahead after the drill-stem test.

Prospect of a dry-gas discovery was seen in Continental 1 O. F. Allenson, in the W.C.R.R. Survey, 9 miles north of Louise, Wharton County. With perforations at about 4,400 ft., the well was reported to have tested dry gas, with pressure of 1,100 lb. Similar results were reported on a second drill-stem test, with perforations at 4,160-65 ft. It was planned to squeeze and perforate at a lower depth.

Two wildcat tests came in dry in the Gulf Coast territory and two new ones were projected. Stanolind was moving in rig for 1 G. T. Pattison, in the J. M. Bennett Survey, Waller County, and Glenn H. McCarthy 1 J. T. Shelby, 3½ miles southeast of Nederland, Jefferson County, was a derrick.

TEXAS GULF COAST COMPLETIONS

Wildcats

Jackson County: H. Merlyn Christie 1 C. H. Gurinsky, R. Musquez Sur., 2 mi. NW of Vanderbilt, dry at 6,058 ft.

Jefferson County: Glenn H. McCarthy 1 Hankamer-Morris & McLean, L. Lopez Sur. A-37, 2 mi. NW of Stowell field, 486 bbl. through 11/64-in. by 6-in. positive chokes, T.P. 1,325 lb., C.P. 1,450 lb. S.I., gas-oil ratio 525, perf. 7,826-34 ft., T.D. 8,622 ft., P.B. 7,850 ft., extension well.

Matagorda County: Cities Service 1 J. E. and N. D. Pierce, J. W. E. Wallace Sur. A-99, 2 mi. SW of Midfields, dry at 9,012 ft.

Fields

Boling, Fort Bend County: Mackhank Petroleum Co. 1 Texas Gulf Sulphur Co., James Scott Sur. A-84, O.W.W.O., old T.D. 4,465 ft., new T.D. in third sidetracked hole 4,339 ft., 298 bbl. through 15/64-in. choke, T.P. 340 lb., C.P. 790 lb. S.I., gas-oil ratio 675.

Lolita, Jackson County: Humble E-1 J. H. Allen, George Ewing Sur. A-20, derrick abandoned. Humble A-24 L. Ranch, I.& G.N. Sur. A-141, derrick abandoned.

North Bay City, Matagorda County: Ohio Oil Co. 1 E. L. McDonald Acct. 2, J. Betts Sur. A-7, dry at 240 ft.

Ohio Oil Co. 2 E. L. McDonald Acct. 2, J. Betts Sur. A-7, 242 bbl. through ⅛-in. choke, T.P. 1,150 lb., C.P. 1,425 lb., gas-oil ratio 613, T.D. 8,819 ft., P.B. 8,763 ft.

Satsuma, Harris County: Amerada-Stanolind 2 L. S. Carpenter, F. Fry Sur. A-267,

(Continued on Page 85)

Every Down Stroke a Power Stroke

The 2-cycle engine was developed to eliminate what was known as the "waste" stroke in 4-cycle operation. In the 2-cycle engine, instead of only half of the piston's down-strokes being power strokes, every down-stroke is a power stroke!

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CLARK 6-Cylinder 600 H.P. "Super-2-Cycle" Angle Compressor

CLARK

Super-2-Cycle

CALIFORNIA

Production Suspended in Coles Levee Field of Kern County

LOS ANGELES, Calif.—Because operators in the Coles Levee field of Kern County in the San Joaquin Valley area failed to submit an acceptable operating plan, the Conservation Committee refused to grant the field an allowable for the month of January and this forced operators to suspend production activities on and after January 1. Operators in this field were warned a month or so ago that they would not receive an allotment for the month of January unless they immediately inaugurated a unit plan or some other method of reducing the gas-oil ratio of wells located on top of the structure and situated within the gas-cap area. In order to give operators ample time to consummate an acceptable operating plan, the Conservation Committee at the last minute allotted 3,100 bbl. per day for the field in question for the first 20 days in January, but the Petroleum Administration for War disapproved the plan. This left Coles Levee operators without an allotment and there was nothing to do but suspend production activities until the matter could be cleared up. Several meetings have been held by operators involved and some form of relief will be made available. All productive property in the Coles Levee field is owned by Kern County Land Co. and it would therefore be an easy matter to work out a unit plan if they wished, as Kern County Land Co. would undoubtedly approve any sound engineering plan for operation of the field.

Production of the Coles Levee field based on recent data showed that Ohio Oil Co. had about 42 per cent of the output, Standard Oil Co. 17 per cent, Richfield Oil Corp. 24 per cent, Union Oil Co. 15 per cent and Tide Water Associated Oil Co. 2 per cent. The controversy that was brought to a head several days ago is based on the fact that the field has been producing at a rate above the so-called m.e.r. factor, due principally to production of wells within the gas-cap area that show very high gas-oil ratios. During the month of December the Coles Levee field had an allotment of 4,500 bbl. per day and produced 4,787 bbl. per day of crude oil. The area involved is the Coles Levee field as distinct from the Tupman field which lies immediately to the north. The Coles Levee field was discovered by Ohio Oil Co. in November 1938 and the Tupman field was discovered by Richfield Oil Corp. in the same month. The discovery of these two fields can be attributed to two geological deductions made about the same time. Both areas were predicated on the assumption that productive fields could be expected at some point along the bifurcated Elk Hills axis which splits into two branches, one extending northeast and the other southeast. Richfield Oil Corp. drilled on the northern branch and found the Tupman field, while Ohio Oil Co. drilled a test on the south limb and found the Coles Levee field. It is this field on the south limb of the bifurcated Elk Hills axis that is involved in the forced shutdown. It is reported that good progress has been made in agreeing on an operating plan that should meet with approval of PAW which has been insistent that gas production of the field be reduced to a level in conformity with sound engineering principals. Operators in the Canal field of Kern County were able last year to agree on a unit basis of operation with approval of Kern County Land Co., and it is logical to assume that a somewhat similar plan will be put into operation at Coles Levee. The plan at Canal has reduced operating expenses and will result in longer sustained production at a lower unit of cost. The Canal field was discovered by Ohio Oil Co. in November 1937 on property leased from Kern County Land Co.

East Strand Field

Some additional data should be available within the next month or so on the East Strand field of Kern County, where Tide Water Associated Oil Co. found a new field a month ago as this company is making preparations to drill a second well at an early date. The new location has been made south of the discovery well in the north central part of 17-30s-26e. The discovery well, 56-8 Kern County Land, is located in 8-30s-26e. Tide Water resumed drilling after completing the discovery well and carried the hole down to 8,351 ft. but ran into mechanical trouble and gray sand in the oil zone and plugged back to 8,197 ft. and returned the well to production flowing 1,798 bbl. daily. The original completion depth was 8,207 ft. so that the company lost 10 ft. of hole by drilling ahead. The productive interval is the Stevens oil sand that has been found so highly productive in the Ten Section, Canal and other similar adjacent fields in the central part of the San Joaquin Valley. Tide Water Associated Oil Co. discovered both the east and west Strand fields, reflecting careful work on the part of the company's geological departments.

Shell Oil Co. is making good progress with its Tulare Lake wildcat in Kings County, 28-22s-20e, but still has some distance to go before reaching the well's objective. This wildcat is being drilled out in Tulare Lake and since the land is submerged the company has found it necessary to do some of the work from a drilling barge that was especially constructed. A water taxi furnishes contact with land and enables drillers to go ashore after each tour.

Texas Co. is grading location for a new well to be drilled at the south end of the South Belridge field of Kern County and actual spud will be made within the next few days. This new well will be drilled on the Wrightson property in 12-29s-21e, south of several wells drilled by E. A. Parkford in the same section. The new well of Texas is located on a 40-acre lease located just north of 1 Fleishacker, a dry hole drilled to 2,265 ft. by General Petroleum Corp. in 1917. E. A. Parkford centered the interest of the oil industry on southern South Belridge last year by completing several good wells outside what had been considered the ultimate outer limits of production. This new production was developed around 1,000 ft. and for this reason the new well of Texas Co. will have the shallow zone as its immediate objective.

SAN JOAQUIN VALLEY COMPLETIONS

Antelope Plains, Kern County: Shell Oil Co. 43-6 Williams, 6-28s-20e, flowed 502 bbl., 16.5-gravity, T.D. 2,320 ft., perf. 2,220-2,315 ft., Williams zone of Miocene age.

Coalinga, East, Fresno County: Shell Oil Co. 106-36 fee, 36-19s-15e, pumped 150 bbl., 22.1-gravity, T.D. 3,660 ft., perf. 3,565-3,660 ft., East Coalinga zone of Miocene age.

Round Mountain, Kern County: Shell Oil Co. 24 Caldwell, 7-28s-29e, pumped 140 bbl., 16.6-gravity, 30 per cent cut, T.D. 1,850 ft. perf. 1,810-50 ft., Vedder zone of Miocene age.

COASTAL DISTRICT

Shell Oil Co. completed another excellent flowing well in the prolific Ventura Avenue field early this week when 157 Taylor was brought in doing 2,598 bbl. per day from 9,500 ft. Despite this great depth, production is coming from rocks of Pliocene age and although this field was discovered back in 1916 and has produced over 250,000,000 bbl. of crude oil up to date, no one has been able to drill entirely through the Pliocene and will probably not be able to do so for a number of years. The Pliocene sediments are extremely thick in the Ventura Avenue field and it may take 15,000 or 20,000 ft. before the underlying Miocene can be reached. This field is characterized by great thick-

ness of oil sand which start almost at the grass roots and continue down to 10,000 ft. Zones of 2,000 ft. thickness are not at all uncommon in the Ventura Avenue field and as a matter of fact wells with thin zones are the exception rather than the rule and are located far down the flanks of the structure.

The Ramsey Oil Co. was the successful bidder for a lease on the Chatsworth Lake, a 17,000-acre-ft. reservoir of the Los Angeles City and Power Bureau in the Newhall-Castaic region and present plans call for the start of drilling within another 30 days. Interest was centered in this region about 2 years ago when the water in the reservoir became contaminated with oil which was found to be rising from below at one corner. Several geologists reported favorably on the area and the lease to Ramsey is the outcome of a series of investigations. Several leases have been taken as a result of this deal and the Ramsey interests have acquired approximately 1,000 acres surrounding the reservoir. Leases have also been taken by a number of other operators including two majors. The Chatsworth reservoir was taken out of service several months ago due to contamination by oil and because of shortage of critical materials and it will not be used again until after the war. The affect of seepage on the accumulation of oil and gas remains to be seen as ordinarily the escape of oil or gas indicates the presence of an unsealed fault or fracture in which even the remaining oil would probably be heavy due to escape of the lighter hydrocarbon fractions. One report on this area indicated the possibility of developing commercial production above 4,000 ft., but it is believed that deep drilling will be undertaken provided the formation continues favorable and structural conditions justify further work.

COASTAL DISTRICT COMPLETIONS

Ventura Avenue, Ventura County: Shell Oil Co. 157 Taylor, 19-3n-23w, flowed 2,596 bbl., 31.6-gravity, 0.4 per cent cut, 2,025,000 cu. ft. gas, 14/64-in. to 40/64-in. bean, pressures 750/1,600 lb. and 1,050/1,700 lb., T.D. 9,500 ft., perf. 3,210-9,497 ft., completed in lower Lloyd zone of Pliocene age.

LOS ANGELES BASIN

Shell Oil Co. has started derrick construction for its deep test to be drilled in the Gilmore Island district of Los Angeles and spud will be made within the next 2 weeks. As had been expected, Shell is making doubly certain that there will be no kickback as a result of this work. The first thing Shell did was to fence in the area immediately adjacent to the location to keep the public away from the scene of operations. It is the present intention to insulate all surface equipment where possible in asbestos and plans contemplate the use of this

(Continued on Page 86)

ROCKY MOUNTAIN AREA

Muddy Sand Saturation Proves Uncommercial in Colorado Test

DENVER, Colo.—Northeastern Colorado suffered a keen disappointment in the failure of the Ramsey Petroleum Corp. 1 Graham, CWL SW SW 14-7n-59w, in the Buckingham district, Weld County, which was abandoned at 7,006 ft. It had the top of the Timpas at 6,161 ft., and the Muddy sand at 6,652-64 ft. This sand showed some oil and gas saturation in the cores, but proved uncommercial. The Dakota was picked up at 6,735 ft. and showed some oil stains in the top and the formation hardened up with depth, the drill going out of it at 6,766 ft. It then picked up a thin sand in shale at 6,815-25 ft. which was water bearing (artesian), the water rising 2,800 ft. in the hole. It was not certain whether this was a lower member of the Dakota or the Lakota and drilling continued to 7,006 ft. to be sure there was no other sand below it. The well is ½ mile southeast of the same company's 1 St. Anthony, drilled 10 years ago, which showed for 6,000,000 cu. ft. of gas in the Muddy sand and a little oil in the top of the Dakota. Subsequently another test was drilled on the west side without results. Ramsey is expected to drill one or two more tests in that area, south of Weldona in Morgan County and the other northwest of Greasewood in Weld County. One conclusion reached by some operators in regard to Northeast Colorado is that it would be a wildcatters' paradise were the drilling depths to the Muddy about half of what they are. Most all of the wells in the area have shown oil in the Muddy and at Greasewood it was in large quantities. This appears to be a lenticular sand which might yield production at almost any location regardless of structure when a good sand body is found.

General Petroleum Corp. 77-6-P (Whitaker), SW SE NE 6-16n-68w, on Horse Creek, Southeast Wyoming, ½ mile south of the discovery well in the Lakota, ran into some bad luck. While coring the Lakota the drill pipe stuck and it had to be shot off. The lower part containing 14 ft. of cores from the Lakota was fished out, but the cores were lost in the operation and it is not yet known what the sand contains. It is now cleaning out. Total depth is 5,626 ft., and the top of the Lakota was at 5,612 ft.

The Superior Oil Co. 1 Government, on Douglas Creek, Rio Blanco County, Colorado, joint with the Continental Oil Co. and the Union Oil Co. of California, cemented the 8⅝-in. casing on bottom at 7,313 ft. It is a "tight" well and the significance of running casing is not reported. However, it has been in red sand below the red beds for several hundred feet in what corresponds to some extent with the objective Weber sandstone.

Ocean Oil Co. has spudded and set 10-in. casing at 765 ft. in a test in the Red Mesa district, La Plata County, Colorado, in its 1 Stewart Brothers, C NW SE 4-32n-13w. It will go to the Point Lookout sand. Location is south and west of a number of wildcats drilled in the district in the past 10 years including two deep tests by the Ohio Oil Co. and the Miley Exploration Co.

The monthly statement of the Montana Oil Conservation Board for November shows that production in that state continues to run below consumption and indicates that December will reveal a further encroachment on storage. Production for the month was 666,936 bbl., against 688,226 in October, a decrease of 21,263 bbl. Storage dropped from 694,666 bbl. to 609,761, a decline of 84,905 bbl. The production for the month staked up 22,232 bbl. daily against a consumption of 25,062 bbl. Exxports to Canada were cut by 80,864 bbl. and crude refined in the state showed a slight reduction compared to October. This situation is developing against an increasing demand for petroleum products from the Pacific Northwest and Alaska.

COLORADO COMPLETIONS

Buckingham district, Weld County: Ramsey Petroleum Corp. 1 Graham, CWL SW SW 14-7n-59w, T.D. 7,006 ft., plugged and abandoned after testing through the Dakota series, top of the Timpas 6,161 ft., Muddy sand 6,652-64 ft., Dakota 6,735-66 ft., Lakota (?) 6,815-25 ft.

WYOMING COMPLETIONS

Lost Soldier, Sweetwater County: Sinclair-Wyoming Oil Co. 10 U. S. Petroleum, NW NW SE 11-26n-90w, T.D. 6,475 ft., top Tensleep 5,262 ft., 7-in. 5,270 ft., 500 bbl. per day.

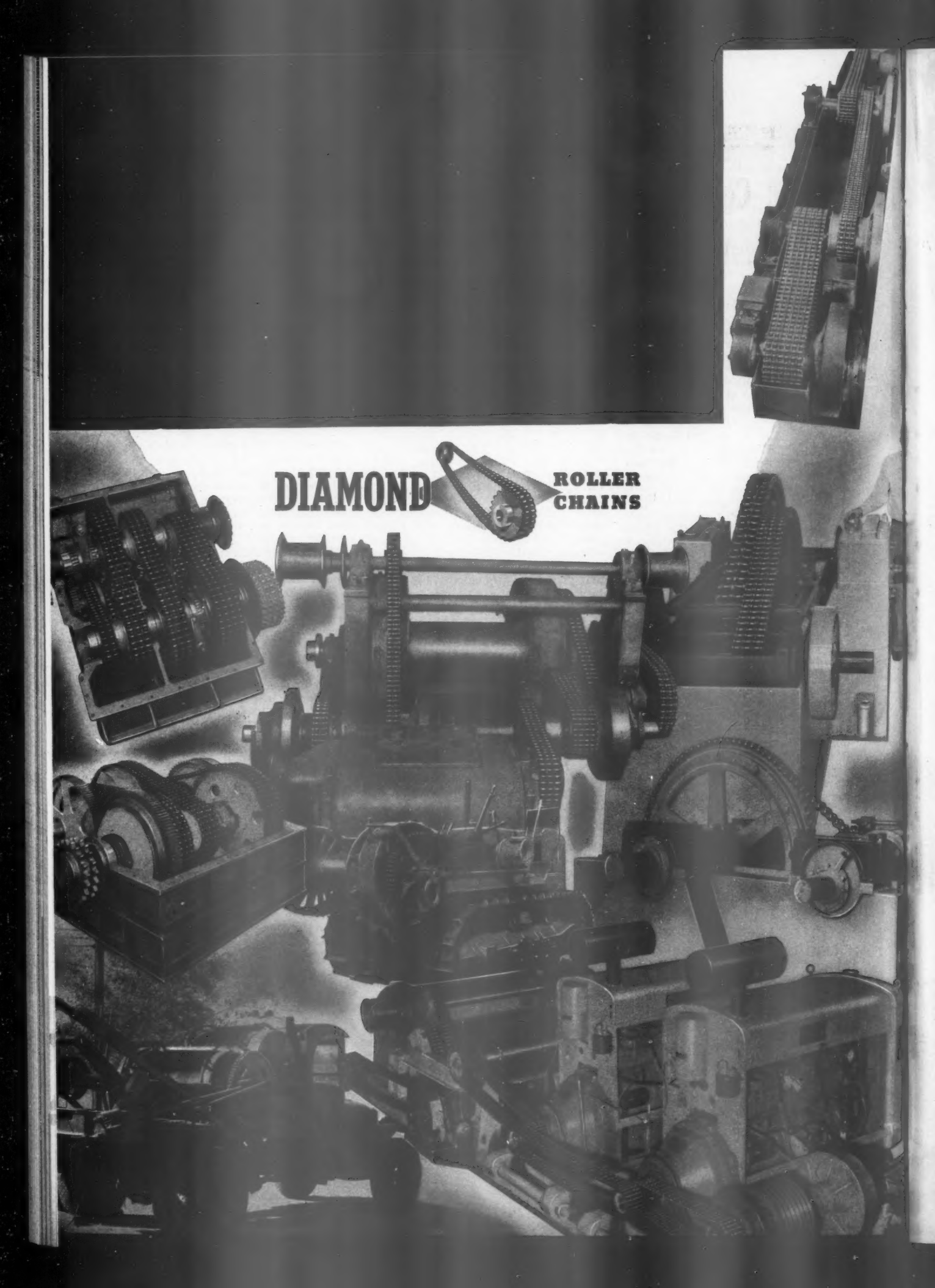
Oregon Basin, Park County: Yale Petroleum Corp. 1 Hancock, NW NW NW, 5-50n-100w, T.D. 3,364 ft., top Embar 3,331 ft., 8⅝-in. 3,336 ft., 240 bbl. per day.

Yale Petroleum Corp. 2 Hancock, NW NE NW 5-50n-100w, T.D. 3,252 ft., top Embar 3,217 ft., 8⅝-in. 3,200 ft., flowed 8 bbl. an hr. through 20/64-in. bean.

MONTANA COMPLETIONS

Cut Bank, Glacier County: Trigood Oil Co. 2 Tribal-231, NW SE NW 30-32n-5w, T.D. 3,038 ft., 7-in. 2,993 ft., no Sunburst sand, Cut Bank 2,973-3,035 ft., main pay 3,023-35 ft., swabbing for test, 1,600 ft. oil in hole.

(Continued on Page 81)


DIAMOND
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CHAINS

PERMIAN BASIN, PANHANDLE

Gaines County Wildcat Opens New Producing Area

MIDLAND, Tex.—Swabbing test after treatment with 6,000 gal. acid gives assurance that Shell Oil 1 Leaverton, Section 458, Block G, C.C. S.D.&R.G.N.G. Railway Co. Survey, Gaines County, opens a new producing area for the northern Permian basin. Top of the Clear Fork lime has not been announced, but the last 300 ft. to total depth 7,772 ft. was broken lime and dolomite. On 24-hour swabbing test, 142 bbl. of fluid was recovered, of which 6 per cent was basic sediment and 5 per cent acid water and the rest oil. Elevation is 3,590 ft., Yates was topped at 3,090 ft., brown lime at 3,910 ft., and San Andreas lime at 4,490 ft. In the Cedar Lake field, eastern part of Gaines County, Stanolind has announced intention to drill an 11,000-ft. Ellenburger test, located 1,650 ft. from south and east lines of Section 5, Block H, D.&W. Survey.

Two new Ellenburger tests were announced for Pecos County. Standard Oil of Texas 1 Douglas Oil et al will be drilled 660 ft. from south and east lines Section 9, Block 194, G.C. &S.F. Survey, on the west flank of the Yates pool, and 9 miles east of a well drilled to total depth 9,811 ft. several years ago by Humble Oil & Refining Co. On acreage bought at the university sale December 4, 1942, Bruce McCandless has staked location for 1 University, SW SE Section 20, Block 26, University Survey, 7 miles south of the Apco-Warner pool. The test is contracted to 6,000 ft., and is 4 miles east of Shell-Kirby 1 University which encountered granite in drilling to total depth 5,204 ft. several years ago. Continental 1 Claybrook is drilling ahead below 5,456 ft. Magnolia 1-29 Eaton was drilling below 4,690 ft., elevation 2,430 ft. Phillips 1 Price passed contract depth of 8,500 ft. and was drilling about 5,600 ft., with no change. C. W. Brown 1 University is a new location, NW NW Section 15, Block 20, University Survey, 3 miles northwest of Taylor-Link pool.

In Crane County Magnolia 1 Tucker, McKee pool, was a failure in the Simpson and Ellenburger zones and was plugging back to perforate casing opposite Permian shows 3,565-72 ft. from total depth 7,204 ft.

In Hockley County, J. C. Hawkins 14-B Mallett, SE cor. Labor 23, League 46, Edwards County School Land, 2 miles north of production in the Slaughter pool, drilled Permian pay from 4,894-4,900 ft. and ran 7-in. casing. Same operator's 57-A Mallett, Labor 12, League 47, set casing at 5,110 ft. through the regular pay and will continue to 6,500 ft.

In Sterling County, Col-Tex Refining 1 Reed, NW SW Section 8, Block 30, W.&N.W. Survey, took drill-stem test 4,708-35 ft. and recovered 45 ft. of mud, and was drilling below 5,650 ft. Ohio Oil 1 Clark, Section 6, Block A, R. R. Wade Survey, was shut down for repairs at total depth 7,051 ft.

In Winkler County, Shell 1 Blue was still drilling chert at 8,445 ft., 55 ft. shy of the contract depth. Carter 2-C Walton, tight Ellenburger test in the Keystone was reported drilling about 7,400 ft.

In Yoakum County Barnsdall Oil 1 Heath, Section 315, Block D, elevation 3,649 ft., topped San Andreas at 4,570 ft., and was drilling below 4,830 ft. in lime.

Rank wildcat for the North Basin is Devore and Slade 1 Dinwiddie et al, Castro County, NE NE Section 10, Block 9-T, 16 miles east of Dimit and 23 miles northwest of Plainview. Contract depth is 5,500 ft. It is on acreage blocked by Humble Oil & Refining Co. which it is reported they worked with gravimeter.

WEST TEXAS COMPLETIONS

Wildcats

Crane County: Gulf 1-A Dawson, S½ W¼ Sec. 10, Blk. 6, H.&T.C. Ry. Sur., elev. 2,348 ft., Simpson 5,160 ft., Ellenburger 5,305 ft., dry, T.D. 5,505 ft.

Schleicher County: Livermore & Wahlenmaier 1 Mrs. Frankie Thompson, SE SW Sec. 75, Blk. TT, T.C. Ry. Sur., elev. 2,207 ft., Ellenburger 6,610 ft., dry, T.D. 7,009 ft., dolomite.

Fields

Eaves, Winkler County: Adams & Bradley 7 Edwards, SE SE Sec. 6, Blk. C-23, Public School Lands, flow 130 bbl., 30.6 gravity plus 35 per cent water, pay 3,159 ft., T.D. 3,185 ft.

Embar-Ellenburger, Andrews County: Phillips Pet. 19 Univ.-Andrews, NE SW Sec. 13, Blk. 11, University Sur., elev. 3,298 ft., dry, T.D. 4,404 ft.

Fullerton, Andrews County: Fullerton Oil 3-A Wilson, NE NE Sec. 16, Blk. A-32, Public School Lands, elev. 3,361 ft., flowed 1,459 bbl., 43 gravity, pay 6,738 ft., Clear Fork lime, acid 24,000 gal., T.D. 7,260 ft.

Texas Pacific Coal & Oil 1 Emily Jackson, NW NW Sec. 17, Blk. A-32, Public School Lands, elev. 3,342 ft., flow 1,790 bbl., 45 gravity, pay 6,775 ft., Clear Fork, acid 24,000 gal., T.D. 7,245 ft.

Keystone-Colby, Winkler County: Ralph Lowe 1-C Seth Campbell, NW SE Sec. 28, Blk. B-3, Public School Lands, elev. 2,881 ft., flow 132 bbl., 38 gravity, pay 3,280 ft., sand, T.D. 3,319 ft., shot 3,280-3,319 ft.

Means, Andrews County: Humble 1 C. A Shultz, SW SW Sec. 5, Blk. C-45, Public School Lands, elev. 3,167 ft., flow 3,25 bbl. gas lift, pay 4,531 ft., acid 5,500 gal., T.D. 4,540 ft.

Noelke, Crockett County: Texas Pacific Coal & Oil 2 fee, Sec. 27, Blk. GG, Wilton Sur., elev. 2,831 ft., flow 208 bbl., pay 1,562 ft., T.D. 1,587 ft.

Slaughter, Cochran County: Continental Oil 1 C. S. Dean 91, SE cor. 525-acre lease, Lge. 91, Lipscomb County School Land, elev. 3,712 ft., flow 1,220 bbl., pay 5,015 ft., lime, acid 12,000 gal., T.D. 5,075 ft.

Slaughter, Hockley County: L. M. Glasco 9-C Mallett L. & C. Co., 580 ft., from S. & E. Labor 17, Lge. 48, Edwards County School Land, flow 672 bbl., 31.6 gravity, pay 4,914 ft., acid 12,000 gal., T.D. 4,961 ft., lime.

T. F. Morrow 8 Mallett Land & Cattle Co., 580 ft. from N & W Labor 22, Lge. 48, Edwards County School Land, flow 585 bbl., 32 gravity, pay 4,936 ft., acid 12,000 gal., T.D. 4,980 ft., lime.

Wasson, Yoakum County: Drlg. & Explor. Co. 10-C C. A. Hudson, NE NW Sec. 834, Blk. D, J. H. Gibson Sur., elev. 3,651 ft., flow 77 bbl., 34.3 gravity, pay, 4,930 ft., acid 9,000 gal., T.D. 5,115 ft., lime.

TEXAS PANHANDLE COMPLETIONS

Hutchinson County: Rogan Oil 4 Kay, 474 ft. from E, 474 ft. from S line, Sec. 27, Blk. M-23, T.C. Ry. Co. Sur., elev. 3,288 ft., pump 43 bbl., pay 3,164-99 ft., dolomite, T.D. 3,211 ft.

Shamrock O. & G. 3 Stewart, SW NE Sec. 19, Blk. M-16, A.B.&M. Sur., elev. 3,323 ft., pump 216 bbl. 18 hr., pay 3,148-74 ft., dolomite, T.D. 3,174 ft.

Phillips Pet. 2 Ray Ebling, NW SW NE Sec. 18, Blk. M-16, A.B.&M. Sur., elev. 3,312 ft., 3 strings tools in hole, junked, T.D. 3,252 ft.

Wheeler County: Phillips Pet. 1 Edwood, SW SW NE Sec. 95, Blk. 17, H.&G.N. Sur., elev. 2,319 ft., show oil 1,970-75 ft., dry, T.D. 2,155 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcats

Guadalupe County: Wirt Franklin Pet. 1 Anton, Chico grant, SW SW Sec. 24, T. 11-n, R. 18e, elev. 5,385 ft., dry, T.D. 2,205 ft. (was reinstated Nov. 25, 1942).

Fields

Jackson, Eddy County: Aston & Fair 1-I Arnold, SE NW Sec. 26, T. 17s, R. 30e, elev. 3,645 ft., flow 25 bbl., pay 3,253 ft., shot 340 qt., P.B. 3,280 ft., T.D. 3,300 ft.

Maljamar, Lea County: Johnny Cockburn 7-B Miller, NE NE Sec. 25, T. 17s, R. 32e, elev. 4,042 ft., flow 240 bbl., perf. 4,050-4,230 ft., pay 4,106 ft., T.D. 4,230 ft., lime.

Michigan Fields

(Continued from Page 75)

14w, wildcat, dry, T.D. 1,973 ft.

Zeeland Township: J. E. Hood 1 Ansink, SE SW SW 29-5n-14w, dry, T.D. 1,480 ft.

Roscommon County, Roscommon Township: American Drilling Co. L-2 State, C N½ NW NE 33-21n-3w, temporarily abandoned, T.D. 4,154 ft.

Rocky Mountain Area

(Continued from Page 79)

Santa Rita Oil & Gas Co. 1 Jackson, C NE SW 25-34n-6w, T.D. 2,950 ft., 7-in. 2,866 ft., Sunburst and upper Cut Bank 2,842-2,941 ft., lower Cut Bank 2,941-44 ft., 400 ft. oil in hole after shot 80 qt., swabbed 10 bbl. in 8 hr.

Santa Rita Oil & Gas Co. 1 Clark, C SW SW 34-35n-6w, T.D. 3,039 ft., 7-in. 2,968 ft., shot 140 qt., bailed 12 bbl. in 14 hr.

SOUTHWEST TEXAS

Gas Field Found Southwest Of Orange Grove

CORPUS CHRISTI, Tex.—The wildcat test 1 L. W. Roth, drilled by H. R. Smith and H. J. Mosser in the George J. Reynolds Survey, 1½ miles southwest of Orange Grove, in Jim Wells County, has been completed as a gas well, producing 10,000,000 cu. ft. daily. The new field opened by this well has not yet received its name.

Gulf's wildcat, 2 Virginia Tatton, 3½ miles east of Tom O'Connor, in the Essey Reed Survey, Refugio County, whose progress has been closely watched since it was spudded last fall, was completed dry at 8,680 ft. In its final test the well yielded 4 bbl. of 46-gravity oil through ⅛-in. choke in 24 hours, with tubing pressure of 143 lb. and gas-oil ratio of 16,900:1. Gas volume was 67,600 cu. ft.

Ending in disappointment too was Ginther, Warren & Ginther 2 Carrie G. and R. H. Wood, 2 miles east of Sarco, in the Pedro Villa & Son Survey, Goliad County, which was completed dry at 5,521 ft. This test was the first one drilled since the same operators' 1 Wood opened the field with a gasser producing 180,000,000 cu. ft. daily, with 0.28 bbl. of distillate for each million feet of gas. Location is a little east of the discovery.

Following a squeeze job, Shell 3 Von Blucher, a wildcat in Refugio County, tested 1,292,000 cu. ft. of gas and 40 bbl. of distillate, through 9/64-in. choke, with perforations at 6,186-90 ft. Tubing pressure was 2,300 lb. and casing pressure 2,350 lb.

Sam E. Wilson, Jr., et al Maria S. de Garza, 2¾ miles east of La Gloria, in Jim Wells County, was fishing for drill pipe, which stuck and twisted off. The hole was near 8,000 ft.

A new wildcat location in the lower Gulf area is Phillips 1 William Huermann, 5½ miles east of Robstown, in Charles Land Survey 412, Nueces County.

In the South Texas area three wildcats were completed, all dry. Three new ones were being started: Sun 3 Weil Brothers, 15 miles south of Hebronville, in the Palitos Blancos grant, Jim Hogg County; Stanolind 1 J. F. Henry, in the A. S. Kuykendall Survey 28, McMullen County, and Sun 2 H. P. Guerra, 9 miles west of the North Sun field, Las Comitas grant, Starr County.

In the South Central Texas area Butcher Co. 1 Albert J. Gambler, 5 miles northwest of Elmendorf, in the Eckert field, Bexar County, was finished dry at 1,720 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Goliad County: Ginther, Warren & Ginther 2 Carrie G. and R. H. Wood, Pedro Villa & Son Sur., 2 mi. E of Carco, dry at 5,521 ft.

Jim Wells County: H. R. Smith and H. J. Mosser 1 L. W. Roth, George J. Reynolds Sur. A-393, 1½ mi. SW of Orange Grove, 10,000,000 cu. ft. gas through ¼-in. choke, perf. 3,245-75 ft., T.D. 5,400 ft., discovery gas well.

Karnes County: Auld, Carter & Coquat 1 A. Schorre, Carlos Martinez Sur. A-6, 5 mi. S of Runge, dry at 7,507 ft.

Refugio County: Gulf 2 Virginia Tatton, Essey Reed Sur. A-251, 3½ mi. E of Tom O'Connor, dry at 8,680 ft.

Fields

Midway, San Patricio County: Midway-Victory Oil Co. 1 Joe Floerke, San Patricio County School Land 4 Sur., SE offset to Phillips 1-A Smith, 60 bbl. through 12/64-in. choke, T.P. 300 lb., C.P. 450 lb., gas-oil ratio 450, T.D. 5,415 ft.

Seeligson, Jim Wells County: Magnolia 37 Seeligson, Los Jaboncillos grant, 161 bbl. through 7/64-in. choke, T.P. 1,075 lb., C.P. 1,275 lb., gas-oil ratio 500, T.P. 6,050 ft.

Stratton, Kleberg County: Chicago Corp. 48 Wardner, Paso Ancho de Abajo grant A-208, 154 bbl. through ⅛-in. choke, T.P. 980 lb., C.P. 1,400 lb., gas-oil ratio 618, T.D. 6,629 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Duval County: Argo Oil Corp. 1 Frank Braslau, J. Poitevent Sur. 137, A-459, 10 mi. NW of Benevides, dry at 2,765 ft.

Frank J. Gravis 1 C. K. Gravis, Sur. 89, 1 mi. S of Tesora field, dry at 6,035 ft.

Starr County: Magnolia 3 Hinojosa est., 2 mi. SW of San Roman, dry at 2,444 ft.

Fields

Colorado, Jim Hogg County: Humble 6 T. T. East, Las Moritas grant, dry at 3,164 ft.

(Continued on Page 87)

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KANSAS, NEBRASKA

Saline Basin Well Finds Oil In Mississippian Chat

SALINE County had prospects of an oil pool at the southeastern corner after nine dry holes had been drilled during 1942. Deep Rock Oil Corp. 1 Hunter, NE NW SW 20-16-1w, was reported to be making 6 bbl. of oil an hour from Mississippian chat at 2,379-83 ft. Location of the well is about 5 miles north of the Roxbury chat pool in McPherson County.

Official completions were reported on three recent pool openers. In Barton County Phillips 1 Frieb, SE SE SW 33-17-14w, pumped 45 bbl. of oil from Arbuckle at 3,441-51 ft. It opens the Boyd pool. Also in Barton County, Appleman et al 1 Stull, S½ SE SW 6-16-12w, flowed 408 bbl. in Lansing-Kansas City at 3,118-30 ft. The well was given three acid treatments, after which it made 136 bbl. of oil in 8 hours. Total depth was 3,332 ft. It is the discovery of the Stull pool.

In Barber County, Great Lakes Carbon Corp. opened the Bear Creek pool with its 1 Welsh, NW SW SE 30-31-15w. Potential was 85 bbl. of oil from Douglas sand topped at 4,234 ft., with pay coming from 4,235-49 ft. Total depth was 5,305 ft., plugged back to 4,235 ft. When cement was drilled out to 4,249 ft., 1,200 ft. of oil and 500 ft. of water rose in the hole in 16 hours.

Kansas operators got off to a good start in the new year with 31 new locations the first week. This compares with less than half the number the previous week. Twenty-four completions for the week comprised 11 oil wells and 13 dry holes. Kansas' production was down again last week at 265,400 bbl. daily, a decrease of 22,950 bbl. over the preceding week. Improved weather permitted a resumption of operations closed down last week by impassable roads.

KANSAS COMPLETIONS

Wildcats

Barber County: Great Lakes Carbon 1 Welsh, NW SW SE 30-31-15w, pumped 85 bbl., Douglas sand 4,234 ft., T.D. 5,305 ft.

Barton County: Phillips 1 Frieb, SE SE SW 33-17-14w, pumped 45 bbl., Arbuckle 3,441-51 ft.

Appleman et al 1 Stull, S½ SE SE 6-16-12w, flowed 408 bbl., Lansing-Kansas City 3,118-30 ft., T.D. 3,332 ft.

Cowley County: B. B. Blair & Summit Drlg. 1 Taylor, NW SW 6-34-5e, dry, T.D. 3,160 ft., Lansing 1,867 ft., Layton 2,355 ft., Kansas City 2,529 ft., Mississippi lime 3,109 ft., no Bartlesville, show dead oil 3,109 ft.

D. D. Fowler 1 Tatum, SW NW 12-31-6e, dry, T.D. 2,962 ft., Mississippi lime 2,940 ft.

Reno County: Nadel & Gussman 1 McRevey, NE NE SE 33-23-9w, dry, T.D. 4,225 ft., Lansing 3,992 ft., Mississippi lime 3,762 ft., Viola 4,060 ft., Simpson 4,125 ft., Arbuckle 4,196 ft., show oil 3,795 ft., 4,125 ft.

Rice County: Rocket Drlg. and Texon 1 Frevert, SW SE SW 30-18-10w, dry, T.D. 3,355 ft., Lansing 2,986 ft., conglomerate 3,282 ft., Arbuckle 3,338 ft., show oil 3,061 ft.

Chas. Coats et al 1 Hill, SW SW NW 33-18-7w, dry, T.D. 3,404 ft., Lansing 2,795 ft., Sooy 3,195 ft., Viola 3,338 ft., Arbuckle 3,363 ft.

Fields

Ainsworth, Barton County: Continental 3 Ford, NW SE NW 10-17-13w, pumped 491 bbl., Arbuckle 3,336-45 ft.

Crowther, McPherson County: Westgate-Greenland 2-A Crowther, S½ NE NW 26-17-1w, 3,000 bbl., Mississippian chat 2,790-2,806 ft.

Cunningham, Pratt County: Skelly 7 Moore, E½ NW SW 25-27-11w, pumped 280 bbl., Lansing 3,437-87 ft.

Darien, Cowley County: Phillips 1 Otto, NE NE NW 4-31-4e, dry, T.D. 3,338 ft., Arbuckle 3,328 ft.

Drach, Stafford County: Stanolind 3 Wm. Harms, N½ SE NW 18-22-12w, dry, T.D. 4,395 ft., Arbuckle 3,839 ft.

Dunns Mill, Cowley County: E. B. Shawver 1 Greer, E½ NW NW 5-30-4e, dry, T.D. 3,130 ft., Arbuckle 3,112 ft.

Eldorado, Butler County: Cities Service 115 Hegberg, NE NE 28-25-5e, pumped 30 bbl., Kansas City 1,942-2,045 ft., T.D. 2,226 ft.

Cities Service 124 Chesney, SW NE 21-25-5e, pumped 30 bbl., Marmaton 2,189-94 ft., T.D. 2,200 ft.

Geneseo, Rice County: Adair & Morton 1 Motler, SW SW SE 19-18-7w, dry, T.D. 3,257 ft., Arbuckle 3,250 ft.

Hall-Gurney, Russell County: Coralena Oil 1 Fink, SE SW 15-14-14w, pumped 179 bbl., Lansing-Kansas City 3,251-55 ft., T.D. 3,308 ft

Kraft-Prusa, Barton County: Solar Oil 4 Schartz, SE NW NE 18-16-11w, 1,809 bbl., swabbed 40 bbl. an hr., Arbuckle 3,253-68 ft.

Rick, Barton County: E. Jones et al 1 Musenberg, SW SW NW 2-19-11w, dry, T.D. 3,485 ft., Arbuckle 3,454 ft.

Roxbury, McPherson County: E. K. Carey 1 Bishop, S½ NW NE 30-17-1w, dry, T.D. 2,722 ft., chat 2,700 ft.

Shutts, Ellis County: Phillips 2 Weigel, NE NW NE 19-12-17w, dry, T.D. 3,765 ft., Arbuckle 3,733 ft.

Stafford, Stafford County: Stanolind 2 Schneider, S½ NE SW 11-24-12w, flowed 64 bbl. an hr. through 1-in. choke, Viola 3,833-40 ft.

Vickers Pet. and Atlantic 1 Koehn-Laudick, SW NW 16-21-14w, dry, T.D. 3,836 ft., Lansing 3,414 ft., Viola 3,683 ft., Simpson 3,720 ft., Arbuckle 3,785 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Ice and snow and bad weather in general have held oil development in the Forest City basin to the sluggish tempo to which it fell some weeks ago. Nebraska, as far as new activity is concerned, has been completely out of the picture in the last couple of weeks. Weather has also had a dampening effect on the McLouth area in Jefferson and Leavenworth counties, Kansas. Missouri's only activity of importance continues to be the Cities Service Oil Co.'s Bartlesville well in Atchison County. This well, 1 Jim Cook in NW NW NW 32-65n-39w, has had trouble with water intrusion. The hole was plugged back and shot, recemented and then casing was gun-perforated. Still further cementing was tried and the company was continuing to work on the well in an effort to make it pay.

EASTERN TEXAS

Nacogdoches County Gasser To Reperforate Casing

DALLAS, Tex. — The Texas Co. 1 G. W. Strahan, Ariola Survey, 7 miles northeast of Nacogdoches, flowed an estimated 15,000,000 cu. ft. of gas through 65 perforations in casing from 8,610-60 ft., reperforated 8,915-40 ft. with 72 shots, and with the tester open 8 minutes recovered 30 ft. of drilling mud with no shows of oil or gas. Squeeze job was being run, and casing will be reperforated opposite a zone showing porosity on electrical survey at 8,965-9,010 ft. The zones being tested are in the Travis Peak formation, topped at 8,614 ft., according to electric log.

In Henderson County, Stanolind 1-B Tri-City unit, 2,525 ft. from the east line and 1,130 ft. from the north line of James Rice Survey, wildcat 6 miles south of Athens, was being rigged up. It was reported that Humble Oil & Refining Co. was curing titles preparatory to staking a test south of Omaha, in Morris County. In Panola County, Smith & Turner 1 Panola Development Co. was staked 3,700 ft. from the north line and 1,000 ft. from the east line of the George Gillespie Survey, 2½ miles southwest of Furrh. In San Augustine County Continental Oil staked location for a wildcat 11½ miles southwest of San Augustine, the 1 Long Bell Lumber Co., 2,900 ft. from the northerly north line and 2,700 ft. from the east line of 2,300-acre tract in the A. Hotchkiss Survey.

In Smith County, Iowa-Payne Oil Co. 1 A. Murray, 5 miles southeast of Chandler, a Woodbine sand test, was drilling in Pecan Gap chalk below 4,000 ft. Phillips 1 Starnes, 1½ miles northwest of Friendship, topped the Woodbine at 3,841, Georgetown at 4,231, and was drilling below 4,813 ft.

In Shelby County, Humble Oil & Refining Co. 1 Harris, east of Arcadia, had caving trouble which was finally overcome after several attempts, and was drilling ahead at about 4,300 ft.

(Continued on Page 85)

CANADIAN FIELDS

Three North Turner Valley Tests Nearing Completion

CHATHAM, Ont. — Crude and natural-gasoline production from all Alberta fields for the week ending December 28 averaged 26,526 bbl. daily, compared with 27,767 bbl. daily for the previous week and 27,166 bbl. daily for the corresponding week of 1941. The daily average included 24,967 bbl. of crude and 1,073 bbl. of natural gasoline from Turner Valley and 486 bbl. of crude from outside fields.

November Production Figures

Crude and natural-gasoline production from all Alberta fields for November totaled 823,056 bbl., or 27,435 bbl. daily, an increase of 294 bbl. daily over October but a decrease of 642 bbl. daily from November 1941. November production from Turner Valley included: Limestone crude, 773,377 bbl.; naphtha, 2,374 bbl.; shallow crude, 539 bbl. Production from outside fields in November included: Red Coulee, 742, bbl.; Vermilion, 4,238 bbl.; Wainwright, 1,358 bl.; Del Bonita, 226 bbl.; Steveville-Princess, 1,096 bbl.; Taber, 8,240 bbl. Among the smaller fields, Taber has ousted Vermilion from first place, wells in the latter area having been partially shut in owing to lack of processing facilities. The November production included 32,188 bbl. of natural gasoline from Turner Valley.

Official Production Figures

North Turner Valley: Northwest-Hudson's Bay 9, LSD 10, 8-21-3w5, total depth 8,287 ft., Madison at 7,845 ft., initial production 694 bbl. daily of 39.7° crude and 691,000 cu. ft. of gas, acidized with 10,500 gal.

Atlas-British Dominion 3, LSD 3, 17-21-3w5, total depth 8,614 ft., Madison at 8,180 ft., initial production 694 bbl. daily of 40.4° crude with 424,000 cu. ft. of gas, acidized with 8,445 gal.

West-Central section: Royalite Oil 69, LSD 8, 35-19-3w5, total depth 7,895 ft., Madison at 7,476 ft., initial production 463 bbl. daily.

Turner Valley Lime Tests

Three important key tests in the North Turner Valley extension are nearing completion in the limestone. West of the present large producers, Miracle Royalties 3, LSD 13, 33-20-3w5, was below 8,046 ft. with Madison at 7,880 ft. Farther north, Northclonmel 1, LSD 16, 7-21-3w5, got the Madison at 8,459 ft. and drilled the upper porous zone of the lime between 8,582 and 8,660 ft. It was deepening below 8,703 ft., logging higher than Alberta Oil Incomes 2 producer, and will be carried through the lower porous. Production in these wells will open a considerable area west of the proven field. On the east flank, Northend Petroleums 1, LSD 12, 9-21-3w5, is stading at 8,949 ft. with Madison at 8,928 ft. If productive, it will open seven or eight new drilling sites to the east.

Northwest-Hudson's Bay 11, LSD 15, 8-21-3w5, has finished at 8,390 ft. with Madison at 7,930 ft., and is acidizing and testing.

New Outpost Tests

Three important key tests will be under way shortly in Turner Valley, designed to further extend the producing area. In the south end of the field, Brown Oil Corp. 6, LSD 15, 5-18-2w5, was rigging rotary to resume from 4,517 ft. This location is about ¼ mile south and east of Northwest-Hudson's Bay 8 producer, at present the most southerly producer in that end of the field. In North Turner Valley, Foothills Oil & Gas 13 has been spotted in LSD 15, 27-20-3w5, offsetting Foothills 9 producer to the east. Foothills 16 will drill in LSD 13, 34-20-3w5, an easterly offset to Home Oil 14.

New Oil Possibilities

The mapping of oil structures in the Canadian west, carried on by the Geological Survey of Canada as part of its 1942 program, has revealed two

(Continued on Page 86)

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APPALACHIAN FIELDS

Work Delayed by Repairs Following Heavy Floods

PITTSBURGH, Pa.—The lower eastern fields are now cleaning up after the heavy floods with much new work waiting on repairs needed in all water-shed areas. A deep test in Pleasants County finally reached the lower Devonian and is drilling to the Oriskany sand.

SOUTHWEST PENNSYLVANIA

In Slippery Rock Township, Lawrence County, T. W. Phillips Gas & Oil Co. bottomed the deep test on the Delilah Hill farm at 6,360 ft. with the bottom of the Lockport dolomite (Salina) at 6,329 ft. There was a small showing of gas in the Lockport. It will not be deepened to the Clinton which is about 500 ft. deeper.

On Chestnut Ridge in South Union Township, Fayette County, Peoples Natural Gas Co. reached 6,251 ft. in the test on the Walters farm and shot it there in an attempt to straighten the hole. The tools were lost breaking through the bridge after shot and they are being fished. Here, New Penn Development Co., William E. Snee et al were drilling at 5,850 ft. in 2 Indian Creek Coal Co. In Maryland, William E. Snee et al were drilling at 5,209 ft. in the old 1 Speicher on the Accident dome in Garrett County and in light brown shale.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Parks Township: Peoples 1 J. L. Blowse, 60,000 cu. ft. gas through Bradford sand, T.D. 3,555 ft.

Clarion County, Limestone Township: George Hall 1 Simpson & Beatty, 15,000 cu. ft. gas, Speechley sand, T.D. 2,575 ft.

Greene County, Jefferson Township: Equitable Gas Co. 2 Belle A. Eaton, 125,000 cu. ft. gas, Gantz sand 2,796 ft., Thirty-foot sand 2,870-2,902 ft., gas 2,878 ft., T.D. 3,386 ft.

Indiana County, Washington Township: T. W. Phillips Gas & Oil 1 Ida Spence, 15,000 cu. ft. gas, through Bradford sand, T.D. 3,500 ft.

Young Township: Apollo Gas Co. 1 Alfred J. Anderson, 33,000 cu. ft. gas, Thirty-foot sand, T.D. 2,048 ft.

WEST VIRGINIA

In Union district, Pleasants County, the deep wildcat of Benedum & Trees on the W. W. Campbell farm was drilling at 5,474 ft. in the Cornriferous lime, the top of which has not yet been placed. This is the only outside deep test now active and is important as it is regionally high.

In Tucker County, the Ohio Oil Co. was drilling at 1,115 ft. in the test on the Kaemmerling tract (West Virginia Power & Transmission Co.) in Dry Fork district.

WEST VIRGINIA COMPLETIONS

Calhoun County, Sherman district: Bowser Gas Co. 4 Edith Z. McDonald, 2 bbl., Big Injun sand, T.D. 2,136 ft.

Coral Poling 3 Coy Robinson, dry through Big Injun sand, T.D. 1,930 ft.

Lincoln County, Jefferson district: United Fuel Gas Co. 5080 Huntington Development Gas Co., 133,000 cu. ft. gas, Big lime 1,687 ft., Injun 1,893 ft., gas from brown shale, T.D. 3,637 ft.

United Fuel Gas Co. 3908 A. E. Dotson drilled deeper from Berea 2,370 ft., 103,000 cu. ft. gas from brown shale, T.D. 3,550 ft.

Eastern Texas

(Continued from Page 83)

EAST TEXAS COMPLETIONS

Wildcats

Smith County: Van Salt Water Disposal Co. 1 fee, McFaddin Sur., elev. 479 ft., dry, T.D. 4,730 ft.

Fields

Chapel Hill, Smith County: Sinclair Prairie 1 A. E. Sanders, Andrews Sur., elev. 498 ft., flow 175.87 bbl., ¾-in. choke, 42 gravity, pay 8,248-8,396 ft., acid 5,000 gal., T.D. 8,396 ft.

Hawkins, Wood County: Humble 1-B Charles Golightly, A. N. Knight Sur., elev. 321 ft., flow 167 bbl., perf. 4,696-4,742 ft., Woodbine sand, P.B. 4,750 ft., T.D. 4,771 ft.

Texas Gulf Coast

(Continued from Page 76)

O.W.D.D., old T.D. 6,830 ft., new T.D. 7,281 ft., 189 bbl. through ⅛-in choke, T.P. 1,250 lb., gas-oil ratio 538.

Stewart, Jackson County: P. R. Rutherford 1 H. A. Meyer, location abandoned.

West Ranch, Jackson County: Magnolia A-242 West Ranch, Ramon Musquez Sur. A-59, location abandoned.

Magnolia A-243 West Ranch, location abandoned.

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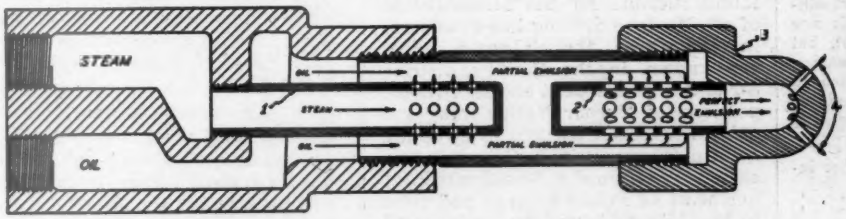

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West Mauritz, Jackson County: J. B. Coffee et al B-3 T. N. Mauritz, M. L. York Sur. A-312, 4,800,000 cu. ft. gas, with spray of distillate through 5/16-in. choke, T.P. 1,900 lb., perf. 5,596-98 ft., T.D. 5,850 ft. (dual completion failed; would not flow through perf. at 5,410-14 ft.).

California Fields

(Continued from Page 79)

material up the sides of the derrick so as to reduce any fire hazard. This well, Verne Community, will finally get under way shortly and thus bring to a close a controversial issue that has extended over several months. Plans for development of the area included the erection of a fireproof building that will reduce drilling noises, the whipstocking of wells from within the building, retention of obnoxious gases and a landscaping program that will enhance the appearance of the structure. Barring a last-minute attempt to stop development, actual drilling will be well under way within the next 3 weeks. This well is being drilled to determine the possibility of developing Miocene production in the old Salt Lake City field that was discovered back in 1910 and which proved to be a major accumulation in the Pliocene. No stone has been left unturned to take care of production in the event commercial production is developed as Shell has already been awarded rights of way for pipe lines in case there is need for them.

Canadian Fields

(Continued from Page 84)

promising new areas in Alberta and one in British Columbia. In Alberta, C. O. Hage mapped the Dyson Creek area southwest of Calgary, and the Cowley area in the southwest part of the province. Both structures were found suitable for the accumulation of oil. No deep drilling has been done in either area, though gas seepages are known in the Cowley district. Structural faults exist and, as in some portions of Turner Valley, may cut off the favorable structures at depth.

In northern British Columbia, an area was examined at Monckman Pass, northeast of Prince George and close to the Alberta boundary, and a definitely promising oil structure was mapped. So far, the Monckman Pass area has never been tested for oil.

Ontario Completions

In the Ontario fields there have been 19 recent completions, of which 9 were commercial gassers, with an aggregate initial open flow of 455,000 cu. ft. daily. An important wildcat test, Union Gas 1 Blenheim, Lot 10, Concession 2, West Communication Road, Harwich Township, some miles east of the De Clute field, finished dry a little below 1,800 ft. Union Gas is starting a new test in Westminster Township, Middlesex County, where its No. 2 is drilling in Lot 3, Concession 3.

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ILLINOIS FIELD REPORT

Golden Gate Field Extended Half Mile Eastward

MATTOON, Ill.—Casing has been set to test McClosky lime saturation at 3,283-93 ft. in the National Refining Co. 1 Hill, W½ SW SE 29-2s-9e, 2 miles southwest of the town of Golden Gate, and ½ mile east of production in the Golden Gate field. A drill-stem test was made of the saturated section and 3,240 ft. of oil was recovered, indicating a definite extension to the Golden Gate pool. If completed as a commercial producer, the 1 Hill will open a considerable area to McClosky production.

The Adams Oil & Gas Co. has set casing and at last reports was drilling plug for a test of the Devonian lime in their 10 Pugh, NW SE 29-4n-1e, in the Patoka field of Marion County. Unconfirmed reports state that the 10 Pugh is a definite oil producer from the Devonian lime, the depth of which is not known. The Patoka pool is located 8 miles northwest of production in the Salem field, which has Devonian lime production. The 10 Pugh, however, will be the first well to obtain production from this horizon in the Patoka field and operators are withholding information until the well can be completed.

The Kingwood 1 J. E. Niggle, NE NE NE 29-5n-5w, Madison County, wildcat 8 miles northwest of the St. Jacob pool, is shut down for orders at a total depth of 2,713 ft. after failing to find any commercial saturation below the Devonian lime. A drill-stem test made on the Devonian showed 35 ft. of oil and 90 ft. of mud, and it is possible that casing will be set for a further test of this pay.

The Deep Rock Oil Co. 1 Windland-Atkinson Community, NE SW 12-2s-6e, Wayne County wildcat, is showing for a good producer from the McClosky lime. After a plug-back job to a total depth of 3,348 ft., and acidizing with 5,000 gal., a recovery of 281 bbl. of oil in 14 hours was obtained. No water was reported. The 1 Windland-Atkinson is located about equidistant from production in the Sims, Johnsonville and Covington pools.

ILLINOIS COMPLETIONS

Wildcats

Bond County: Kilpatrick et al 1 Kage, SE SE NW 9-4n-3w, dry at 1,160 ft., Aux Vases 1,125 ft.

Clay County: C. H. Nickerson 1 Gatewood, W½ NE NE 23-3n-6w, pumped 149 bbl., McClosky 2,983-3,015 ft., T.D. 3,074 ft.

Crawford County: Rush Meredith 1-A Mushrush, NE SE NE 20-5n-13w, dry at 2,550 ft., Aux Vases 2,420 ft.

Edwards County: Ohio 1 Harris, SE SE NE 18-2s-10e, dry at 3,475 ft., Aux Vases 3,246 ft., McClosky 3,370 ft.

Jefferson County: Central P. L. 1 Paul Mace, NW NW SW 34-3s-3e, dry at 2,834 ft., Aux Vases 2,702 ft., Fredonia 2,811 ft.

Madison County: Roy Powers 1 Kaufman, SW NE NE 21-5n-6w, dry at 2,555 ft., Devonian 1,776 ft.

Marion County: Lario et al 1 Holson, SW NE 17-4n-4e, dry at 2,384 ft., Cypress 2,057 ft., Benoist 2,160 ft., St. Louis 2,388 ft.

Randolph County: General O. & G. 1 Schnoll, SE NE SW 27-4s-4w, dry at 969 ft.

St. Clair County: Smokey Oil 1 Kinsella, NW SE 16-2n-8w, dry at 2,009 ft., Trenton 1,925 ft.

Smokey Oil 1 Morris, SE SE 14-1n-6w, dry at 2,765 ft., Devonian 1,977 ft., Trenton 2,672 ft.

Washington County: C. V. Richardson 1 Brink, NW NW NW 27-1s-2w, dry at 1,584 ft., Aux Vases 1,510 ft., Ste. Genevieve 1,580 ft.

White County: W. C. McBride 1 Millikan, SE SE SE 4-7s-9e, dry at 3,137 ft., Aux Vases 2,927 ft., McClosky 3,022 ft.

Fields

Allendale, Wabash County: Bell Brothers 2 Smith, SE SW NW 9-1n-12w, dry at 1,504 ft., Biehl 1,488 ft.

E. O. Olds 1 Whitehead, E½ SE NE 18-1n-11w, dry at 2,262 ft., Aux Vases 2,161 ft.

Benton, Franklin County: P. Pruitt 3 Minier, SE SW SW 30-6s-3e, pumped 25 bbl., Tar Springs 2,100 ft., shot 2,102 ft., T.D. 2,110 ft.

E. S. Adkins 2 Peabody Coal, NE NW SW 18-7s-3e, dry at 2,076 ft., Waltersburg 1,990 ft., Vienna 2,052 ft.

Bible Grove, Clay County: Texas 2 M. Bloemker, NW SW NE 4-5n-7e, pumped 65 bbl., Cypress 2,501-22 ft., T.D. 2,528 ft.

Kingwood 2 Lewis, NW SW SW 9-5n-7e, pumped 104 bbl., Weiler 2,517-24 ft., shot 2,522-25 ft., T.D. 2,529 ft.

Walter Duncan 2 Lewis, NW SW SW 9-5n-7e, pumped 109 bbl., Weiler 2,527-39 ft., T.D. 2,541 ft.

Blairsville, Hamilton County: Texas 4 Minton, NE NE SE 20-4s-7e, pumped 95 bbl., shot 3,298 ft., Aux Vases 3,300-08 ft., T.D. 3,308 ft.

Texas 2 Ledbetter, SW SE NW 21-4s-7e, pumped 40 bbl., shot 3,312-27 ft., Aux Vases 3,310-32 ft., T.D. 3,332 ft.

Cordes, Washington County: Shell 9 Kazuszek, SE SE NW 23-3s-3w, pumped 5 bbl., shot 1,272 ft., Cypress 1,064 ft., T.D. 1,282 ft.

Dale, Hamilton County: Schulman Bros. 1-A Hall, SE SW SW 8-6s-7e, dry at 3,062 ft., Aux Vases 3,022 ft.

Texas 10-D Hall, SE SW NW 17-6s-7e, pumped 25 bbl., Cypress 2,730-63 ft., shot 2,741-56 ft., T.D. 2,764 ft.

East Centralia, Marion County: Broadus & Lilly 1 Lancaster, NE NW NW 16-1n-1e, pumped 74 bbl., shot 1,652-62 ft. in Cypress, T.D. 1,664 ft.

East Dundas, Richland County: Pure 1-E Stiff, SW NE 26-5n-10e, dry at 2,993 ft., Fredonia 2,962 ft.

East Inman, Gallatin County: Cherry & Kidd 11 Kerwin, SE NW SW 11-8s-10e, pumped 20 bbl., shot 2,063-75 ft., Clore 1,731 ft., Tar Springs 2,039 ft., T.D. 2,076 ft.

Friendsville, Wabash County: W. E. Baylor 2 Liddle, SW NW SW 26-1n-13w, pumped 40 bbl., Biehl 1,764 ft., T.D. 1,780 ft.

Grayville, White County: Skelly 3-A Fearn, SE SE SE 19-3s-14w, dry at 3,090 ft., Aux Vases 2,913 ft., McClosky 3,029 ft.

Iola, Clay County: Texas 1 Rush, SE SE NW 10-5n-5e, dry at 2,588 ft., McClosky 2,494 ft.

Luttrell et al 2 Reed, SW NW NE 15-5n-5e, dry at 2,288 ft., Cypress 2,133 ft., Benoist 2,274 ft.

Texas 1 Kidwell, SE NE NW 15-5n-5e, pumped 200 bbl., McClosky 2,466-68 ft., 2,475-82 ft., T.D. 2,488 ft.

Mount Carmel, Wabash County: Seaboard and Gulf 4 Guiswith, NE NW NE 21-1s-12w, pumped 49 bbl., Tar Springs 1,969-77 ft., shot 1,969-77 ft., T.D. 2,362 ft.

North Benton, Franklin County: Armstrong & Day 2 Wayman, NE NW SW 1-6s-2e, pumped 32 bbl., Cypress 2,489 ft., perf. 2,864-76 ft., T.D. 2,811 ft.

North Sims, Wayne County: Pure 1 Richards Consol., NW NW 20-1s-6e, dry at 3,177 ft., McClosky 3,165 ft.

Omaha, Gallatin County: Carter 1 Duckworth, SE SE NW 33-7s-8e, 2,000,000 cu. ft. gas, Tar Springs 1,985-2,007 ft., T.D. 2,007 ft.

Phillipstown, White County: Sun 4 Hoosier-Spencer, SE NW NW 6-5s-11e, pumped 80 bbl., Tar Springs 2,300-68 ft., T.D. 2,388 ft.

Sun 2 Hoosier-Spencer, SW NW NW 6-5s-11e, pumped 5 bbl., Weiler 2,692 ft., T.D. 2,726 ft.

Jarvis & Marcell 11 Spencer, NE NW SW 31-4s-11e, pumped 150 bbl., Tar Springs 2,335-58 ft., T.D. 2,358 ft.

Rural Hill, Hamilton County: Shell 1 Bue, SW SE NE 12-6s-5e, pumped 14 bbl., shot 3,128-38 ft., Aux Vases 3,095 ft., T.D. 3,142 ft.

South Mason, Effingham County: Tide Water 6 Burk, SW NE SW 27-6n-5e, pumped 22 bbl., shot 2,308-16 ft., Benoist 2,300-24 ft., T.D. 2,385 ft.

Tide Water 7 Burk, SW SE SW 27-6n-5e, pumped 60 bbl., Benoist 2,296 ft., shot 2,300-10 ft., T.D. 2,312 ft.

Texas 1 Prather, NW SE NE 34-6n-5e, pumped 75 bbl., Benoist 2,240-60 ft., T.D. 2,356 ft.

South Lawrence, Lawrence County: Brinkerhoff 2 Putnam, NW SE NE 23-2n-12w, dry at 2,013 ft., Ste. Genevieve 1,959 ft.

Walpole, Hamilton County: Texas 1 J. A. Irvin, NW SW NE 35-6s-6e, pumped 209 bbl., shot 3,111-16 ft., Aux Vases 3,104-16 ft., T.D. 3,116 ft.

Southwest Texas Fields

(Continued from Page 82)

Driscoll, Duval County: Continental 12-B Clara Driscoll, U. Lott Sur. 484, 108 bbl. through ¼-in. choke by gas lift, T.P. 75 lb., C.P. 350 lb., gas-oil ratio 175, T.D. 3,010 ft.

Rincon, Starr County: Continental and W. R. Davis, Inc., 77-A Slick est., C.C.S.D. and R.G.N.G.R.R. Sur. 529, dry at 4,246 ft.

Sejita, Duval County: Standard of Texas and Trinity Gas Corp. 1 Juan Canay, San Pedro de Charco grant, dry at 7,186 ft.

Standard of Texas and Trinity Gas Corp. 1 Frank Smith, Charco de Redondo Sur., dry at 6,025 ft.

South Campana, McMullen County: Magnolia 3 P. G. Kynette, B.S.&F. Sur. 101, A-138, 133 bbl. through ½-in. choke, T.P. 475 lb., C.P. 775 lb., gas-oil ratio 405, T.D. 3,016 ft.

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NORTH CENTRAL TEXAS

Caddo Lime Pool Discovered Southwest of Hoefle Field

WICHITA FALLS, Tex.—First discovery for North Texas in 1943 was Hanlon-Buchanan 1 Ellis & Dubose, 4,121 ft. from south line, 2,759 ft. from west line of J. W. Williams Survey A-877, 6 miles south of Antelope and 2 miles southwest of the Hoefle pool. Saturated Caddo lime was logged from 4,785-98 ft., drilling stopped at 4,828 ft., and the saturated section was treated with 3,000 gal. of acid. The well flowed 128.68 bbl. in 6 hours through ¼-in. choke on tubing, making 56.48 bbl. in the last 3 hours of the test. Twelve miles southeast of Jacksboro, Rathke Oil 1 Jagoda, J. R. Erwin Survey, had a show of gas in sand from 4,471-75 ft. and set 7-in. casing as protection string before drilling ahead. Shell Oil 1 Wolfe, 3 miles east of Jermyn, had a stain of oil in the Bryson sand at 3,210-28 ft. and was drilling below 4,490 ft. Youngblood & Foree 1 C. P. Clayton, 6 miles west of Perrin, twisted off drill pipe and whipstocked by at 5,040 ft.

In Clay County Shell Oil 3 Mattie Clark perforated casing opposite the Strawn sand at 3,950-75 ft., treated with 1,000 gal. acid, and swabbed 35 bbl. of oil with 18 bbl. of water in 18 hours. Total depth is 6,135, plugged back to 4,050 ft.

In Cooke County, east of Walnut Bend pool, Sinclair Prairie 1 Winger had show of oil in Simpson at 5,533-50 ft., filled 2,830 ft. with oil, and was running casing. The upper pays showed mud and water on drill-stem tests.

In Montague County the Forestburg pool was defined on the east by Sinclair Prairie 6 I. M. Jones, which was abandoned at 7,290 ft.

In Young County G. W. Cooper 1 M. K. Graham, 8 miles northeast of Graham, tested a slight show of oil in Caddo at 4,157 ft., topped Marble Falls lime at 4,410 ft., and was drilling toward the Ellenburger lime.

New operation for Throckmorton County is Hanlon-Buchanan and Standard of Texas 1 W. T. Donnell, northeast corner of Section 2623, T.E. &L. Survey, ⅛ mile west of the discovery Caddo lime producer 4 miles northwest of Murray, Young County. In the same area, 3 miles southeast of Murray, R. V. Tidwell 1 Harty estate filled 1,000 ft. with water after standing 12 hours and will squeeze off perforations 3,535-49 ft., Caddo lime.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Jack County: Barnsdall Oil and Youngblood & Foree 1 Lizzie Garrison, Thomas Nash Sur., Marble Falls 4,890 ft., Miss. 5,663 ft., Ellenburger 5,775 ft., dry, T.D. 5,838 ft.

Hanlon-Buchanan 1 Ellis & Dubose, Lot 6, J. W. Williams Sur. A-877, flow 541 bbl., pay 4,798-4,827 ft., lime, T.D. 4,828 ft., discovery.

Montague County: Youngblood & Foree 1 Joe Benton, Abel Lewis Sur. A-240, dry, T.D. 6,191 ft., lime.

Youngblood & Foree 1 Quillin estate, 1,690 ft., from NW, 3,490 ft. from SW F. J. Bellows Sur. A-32, dry, T.D. 7,261 ft.

Wilbarger County: E. D. Miller 1 J. L. McCrary, Sec. 64, H.&T.C. Ry. Sur., Blk. 14, dry, T.D. 1,882 ft.

Fields

Forestburg, Montague County: Sinclair Prairie 6 I. M. Jones, SE cor. I. Singletary Sur. A-707, Marble Falls 7,102 ft., show oil 7,111 ft., dry, T.D. 7,290 ft., lime.

Burkburnett Shallow, Wichita County: H. L. Graham 1 Tom Reese, D. Matthews Sur. A-668, dry, T.D. 1,623 ft.

K.M.A., Wichita County: W. H. Hammon 18 fee, Sec. 2, E.T.R.R. Sur. A-762, flow 426 bbl., pay 3,987 ft., T.D. 4,017 ft.

K.M.A. Ellenburger, Wichita County: Showers & Moncrief 1-E W. P. Ferguson, Lot 8, William Spillers Sur. A-257, flow 504 bbl., pay 4,231 ft., dolomite, T.D. 4,281 ft.

Padgitt, Young County: Shell Oil 1-A E. W. Foster, NE SE Sec. 337, T.E.&L. Sur., elev. 1,332 ft., Caddo 4,210 ft., Miss. 4,711 ft., Ellenburger 4,938 ft., dry, T.D. 4,986 ft., lime.

Thornberry, Clay County: Wilder Drlg. Co. 2 C. T. Taylor, Sec. 41, Bacon subd., pump 12 bbl., pay 1,070 ft., T.D. 1,075 ft.

Watson, Clay County: Roy Lee, tr., 1-A G. J. Conrady, 647 ft. from E, 808 ft. from S of west 406 acres, J. H. Fisher Sur. A-154, Caddo 5,206 ft., dry, T.D. 6,014 ft.

Whitaker Oil 1 J. L. Gragg, Sec. 2672, T.E. &L. Sur., elev. 1,055 ft., pump 24 bbl., pay 3,655 ft., shot, Strawn sand, T.D. 4,677 ft., new pay.

Whitaker Oil 2 Mrs. L. M. Newton, Sec. 2673, T.E.&L. Sur., flow 135 bbl., pay 5,453 ft., lime, acid 3,500 gal., T.D. 5,475 ft.

Whitaker Oil 3 Mrs. L. M. Newton, Sec. 2673, T.E.&L. Sur., pump 198 bbl., pay 3,619 ft., Strawn sand, T.D. 3,657 ft.

WEST CENTRAL TEXAS

FORT WORTH, Tex.—The Strand pool, on the line between Jones and Haskell counties, was given a good producer last week by S. B. Roberts et al 1 Hazel Strand, NE SW Section 5, Block 5, H.&T.C. Ry. Co. Survey, which flowed 10 bbl. per hour from Palo Pinto lime topped at 3,446 ft., bottomed at 3,450 ft. This appears to be the best well in this pool, which was discovered a couple

(Continued on Page 103)

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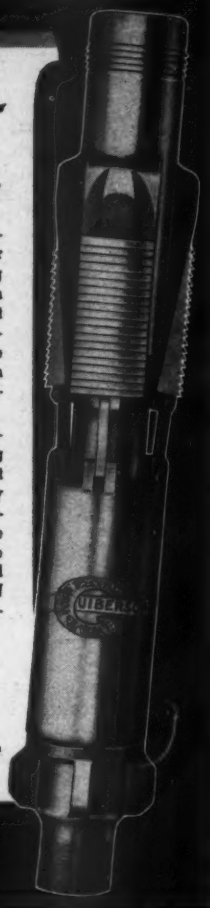

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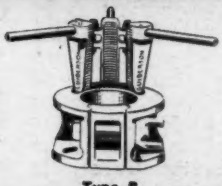

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KENTUCKY, OHIO, INDIANA

Maxon Sand Field Opened in Virgie Area of Pike County

ASHLAND, Ky.—A "wildcat" well drilled in with an estimated 35 to 50 bbl. of oil daily production has turned the Eastern Kentucky spotlight directly on the Virgie area in Pike County.

The well, completed by the Utilities Elkhorn Coal Corp. on a tract owned by the same concern, is attracting considerable attention in this part of the state and has been visited by State Geologist Dan Jones. Results of his inspection are not available here but local operators have commented on the well and the field possibilities.

At the same time drilling operations in other parts of the Eastern Kentucky region showed a slight increase during the week and the Kentucky West Virginia Gas Co. reports the completion of well No. 107 on the J. P. Akers land on Right Beaver Creek in Floyd County. The well, an old one drilled deeper, reached a total depth of 2,378 ft. in shale and has a daily open flow of 140,000 cu. ft. of gas after the shot.

Usually reliable sources here, commenting on the new Pike County well, doubt that an extensive field will be developed in the Virgie area and point to other developments in the Upper Big Sandy region as the basis for their contention.

The "wildcat" was completed in a formation described at Virgie as "Bradley." However that is a term of the locality, which had its origin in a description of the formation on the old Bradley farm where large gas wells were developed in the Turkey Creek, Goose Creek and Gosling Fork waters of Right Beaver, south of Maytown in Floyd County.

Ashland sources say the formation in which the new well was completed at a depth reported here of about 1,900 ft. is Mauch Chunk, known in Eastern Kentucky as Maxon. These same sources point out that other discovery wells in the Upper Big Sandy section were due to deposition conditions.

The closest oil well to the new "wildcat" is 12 miles due west in Knott County at the head of Right Beaver in waters of Dry Creek, while to the north the closet well is 17 miles away on Mare Creek in Pike County. This well is producing from the Keener, 200 ft. below the producing formation of the new well. At present the oil is being trucked from the well.

It is understood here that most of the acreage in the Virgie area is already under lease or owned by corporations and companies.

OHIO

ZANESVILLE, Ohio.—Sinclair Prairie has drilled through the Clinton sand in its wildcat test on the Longstreth tract in Olive Township, Meigs County, without finding any show of oil or gas. The formation, a very hard white quartzitic sand, was found at 5,398-5,462 ft. The hole is being reamed preparatory to drilling to the Trenton limestone. The Preston Oil completed a 190-bbl. well on the Cookson tract in the Clayton pool, which is still active with nine locations and 10 drilling wells.

OHIO COMPLETIONS

Athens County, Carthage Township: Ohio Fuel 1 Eliz. Warner, Sec. 32, Berea, 386,000 cu. ft., T.D. 1,732 ft,

Hocking County, Ward Township: Kachelmacher 7 Nelsonville Coal & Ld. Co., Sec. 19, shale, 18,500 cu. ft., T.D. 1,984 ft.

Medina County, Granger Township: M. L. Packard 18 Anna L. Crocker, Lot 25, Berea, dry, T.D. 457 ft.

Meigs County, Orange Township: H. B. Walker 1 Cesco Adkins, Sec. 35, Berea, 450,000 cu. ft., T.D. 1,615 ft.

Morgan County, York Township: Ohio Fuel 1 Harlon E. Bush, Sec. 35, Clinton, dry, T.D. 4,309 ft.

Muskingum County, Newton County: Ohio Fuel 1 William Powell, Sec. 7, Clinton, dry, T.D. 3,542 ft.

Noble County, Enoch Township: F. E. Gerst et al 3 Felix Gerst, Sec. 20, Berea, 669,000 cu. ft., T.D. 1,523 ft.

Perry County, Clayton Township: Preston Oil 8 J. H. Cookson, Sec. 8, Clinton, 190 bbl., T.D. 3,318 ft.

INDIANA

EVANSVILLE, Ind.—John M. Seip has opened a new Trenton oil field with the 1 Keys, NW SW 23-20n-14e, Randolph County. The well topped the Trenton lime at 1,092 ft. and encountered saturation at 1,092-1,116 ft. and 1,122-40 ft. It pumped 127 bbl. of 41-gravity oil in the first day and was shut down for storage. In addition to the Keys well, J. M. Seip 1 Fraze, SE SE 28-21n-14e, is being completed in the new field. No. 1 Fraze topped the Trenton at 1,018 ft. and filled 550 ft. with oil following shot. Pumping equipment is being installed for a test of this well. The new field opened by these wells is approximately 2 miles east of the extreme eastern boundary of the old Trenton gas field. Permits have been issued for four aditional tests in the field, two of which are offsets to the discovery wells.

INDIANA COMPLETIONS

Daviess County: J. W. Cannon 3 R. Beck, NW NE SE 8-2n-5w, pumped 2½ bbl., natural, Paint Creek sand 630-39 ft., T.D. 639 ft.

Marshall County: J. E. Short 2 J. Schroeder, NE NE NW 6-34n-1e, dry at 285 ft., New Albany 243 ft., Devonian 255 ft., show oil and water 255-67 ft., not sufficient to test.

NORTH LOUISIANA

Haynesville Pool Extended Into South Arkansas

SHREVEPORT, La.—The Haynesville Pettit lime pool of North Louisiana, long one of the most active oil pools in this area, and which has been advancing steadily north over the past several months, crossed the Arkansas State line last week into Columbia County at Navarro Oil Co. 1 Beene. Porosity was found at 5,453-78 ft. and the well flowed 163 bbl. of oil a day. Total depth was 5,540 ft. Location of the well is 660 ft. north by 1,966 ft. east of the SW cor. 10-20s-20w.

Another Arkansas extension was Southwood Oil Co.'s 5 Hodnett, NW NE 18-15s-23w, completed for a 25-bbl. well. It is on the eastern end of the Midway field of Lafayette County. Porosity was found in the Smackover lime at 6,458-74 ft. The same company's 7 Hodnett, on the north edge of the field and west of the No. 5, was deepened to 6,466 ft. It was shut in for tanks. Top of pay was 6,311 ft. and tubing pressure built up to 800 lb.

ARKANSAS COMPLETIONS

Dorcheat, Columbia County: Carter Oil 1 Kirkpatrick, N½ SW 13-18s-22w, flowed 72 bbl. condensate, Smackover lime 8,880-8,912 ft., T.D. 9,000 ft.

Fouke, Miller County: Carter Oil 11 Sturgis, SE NE NE 1-17s-27w, pumped 240 bbl., sand 3,648-54 ft., T.D. 3,890 ft.

Haynesville, Columbia County: Navarro Oil 1 Beene, SE SW 19-20s-20w, flowed 163 bbl., Pettit 5,463-78 ft., T.D. 5,540 ft.

Midway, Lafayette County: Southwood 5 Hodnett, NW NE 18-15s-23w, flowed 25 bbl., Smackover 6,458-74 ft., T.D.

NORTH LOUISIANA COMPLETIONS

Sugar Creek, Claiborne Parish: Roy Lee 2 Richard Sapp, 18-19n-5w, flowed 5 bbl. an hr., perf. 5,784-5,806 ft., 5,838-50 ft., T.D.

Lisbon, Claiborne Parish: Big West Drlg. 1 Rodosill, 24-21n-5w, dry, T.D. 9,905 ft.

ALABAMA

Three Shreveport operators, H. C. Cummings, J. L. Spier and G. L. Williams, were reported to have spudded in and set surface casing for a wildcat test in Maringo County, 150 miles southwest of Birmingham and 130 miles north of Mobile. The well will be carried to the Eutaw and Tuscaloosa strata if necessary. Johnny Pate, formerly of the Triangle Drilling Co., is the contractor.

Yields Compared With Lake Charles Refinery

(Continued from Page 23)

8,700 bbl. of 91-octane aviation gasoline; 2,600 bbl. of butylene feed stock for the butadiene plant; 8,900 bbl. of civilian motor gasoline and 28,100 bbl. of kerosene and fuel oil.

"It will be noted that a very high yield of 100-octane gasoline will be obtained; i.e., 24 per cent, by which I mean that for every 100 bbl. of crude oil refined, 24 bbl. of 100-octane gasoline will be produced. The yield of civilian motor gasoline will be only 13 per cent based on crude. This may be compared with the national average of before the war of about 45 per cent gasoline based on crude. As of November 1942 after applying all sorts of restrictions to the yield of motor gasoline and after many of the refineries had gotten into war products production, the average yield of motor gasoline of all refineries in District 3, the Gulf Coast and the inland refineries in Louisiana, Texas, and New Mexico, was 32 per cent. . . .

"I assume that the committee is primarily interested in appraising the Lake Charles project from the standpoint of whether a good use is being made of the $63,000,000 worth of construction as compared with what might have been done had some other course of action been followed. Such appraisal is difficult because so many factors and so many variables are involved. It appears to me that the most practical brief answer to the question can be derived by comparing the Lake Charles project with its peers; that is, with other petroleum projects producing 100-octane gasoline and butadiene. For this purpose I have reviewed the figures concerning two somewhat comparable petroleum war projects; namely, the Port Neches project and the Houston project.

Port Neches Comparison

"As to the Port Neches project it centers around a Defense Plant Corp. butadiene plant which is scheduled to produce 100,000 tons per year of butadiene. In order to produce this butadiene, it is necessary to provide butylene as a raw material. This butylene will be supplied by five refiners in the vicinity; namely, Atlantic, Gulf, Magnolia, Pure and Texas. These refiners will each produce 100-octane aviation gasoline. In fact three of them were producing such a product before the war. However, in order to get enough butylene for the butadiene plant and in order to produce the additional amounts of 100-octane required, a large investment in the five refineries is necessary over and above the cost of building the butadiene facilities. The total investment for new 100-octane facilities, new facilities for providing the butylenes and the new government-owned butadiene plant will be $96,000,000. As a result of this expenditure in materials and labor, the Port Neches group as a whole will produce 35,100 bbl. per day of additional 100-octane aviation gasoline and 100,000 tons per year of butadiene. Thus, as a result of an additional investment of something more than 50 per cent greater than that made at Lake Charles, we will produce not quite twice as much butadiene as Lake Charles will produce and something more than twice as much aviation gasoline. If we leave the comparison at that point, it would be fair to conclude that the bigger such units are built the more economic they are in the use of construction materials. I think this is a fair assumption.

"Suppose, for example, Lake Charles had been planned twice as big as it was. It would then produce about as much 100-octane and butadiene as the whole Port Neches project will produce. If no economy could be effected in building it bigger, it might be expected to cost two times $63,000,000 or $126,000,000. This may be contrasted with the actual figure at Port Neches of $96,000,000. However, if it had been otherwise feasible to build the Lake Charles project twice as big to produce twice as much material I doubt that it would have cost as much as $96,000,000. Further, it would not be fair to leave the comparison between the projects on the basis of construction cost alone because we must also consider how much raw material it is going to take to make the aviation gasoline and the butadiene that we want. I have previously stated that the Lake Charles project was going to run 70,000 bbl. per day of crude oil and if it had been doubled in size as I suggested a moment ago, the crude requirement would be doubled also and would amount to 140,000 bbl. per day. However, when the refiners in the Port Neches area complete their construction projects and actually produce the 35,100 bbl. of new 100-octane gasoline (plus their present rated productive capacity of another 11,800 bbl. of 100 octane) and the 100,000 tons per year of butadiene, it will be necessary to run each day in the refineries of that area about 407,000 bbl. of crude oil. The total yield of 100-octane gasoline to be obtained in the Port Neches area —that is the 100 octane to be produced by the new facilities plus the 100 octane now being produced from the present facilities—is only 11½ per cent based on crude as contrasted with the 24 per cent figure which I gave you in the case of the Lake Charles project. . . .

Houston (Texas City) Analysis

"Another standard of comparison which we can use to measure the merit of the Lake Charles project is the petroleum war products development at Houston and Texas City. Adjacent to the Sinclair refinery at Houston, another Defense Plant Corp. butadiene plant is being installed to produce 50,000 tons a year of butadiene or about 9 per cent less butadiene than will be produced by the Lake Charles project. The total new investment necessary to produce this 50,000 tons per year of butadiene plus 13,400 bbl. per day of new 100 octane is $53,000,000 as contrasted with the $63,000,000 expenditure at Lake Charles. This expenditure includes new cracking and 100-octane facilities at the Sinclair refinery, at Crown Central and at Pan American, all of which will supply feed stock for the butadiene plant and, of course, also includes the cost of the butadiene plant itself. We can make a somewhat more direct comparison in the case of the Houston (Texas City) project and the Lake Charles projects since they are approximately of the same size and the general conclusion to be drawn from the figures which I have stated is as follows:

"The Houston (Texas City) project will produce 19 per cent less new aviation gasoline and 9 per cent less butadiene at a cost of 16 per cent less for materials and labor. Whereas the Lake Charles plant will require the use of only 70,000 bbl. per day of crude oil to accomplish this purpose, we estimate that the Houston (Texas City) project will require about 155,000 bbl. or something more than twice as much crude to produce less war products. It must be understood as not any criticism of the Houston (Texas City) project, which we also approved. It merely illustrates the point that when in a rare case everything works together it is possible to obtain great quantities of war products from relatively small quantities of crude oil and with the use of critical construction materials and labor in an amount no more than and possibly less than would have to be expended if such production were to be obtained by building special equipment adjacent to existing refineries."

Eighth Atlantic Tanker Launched in New Program

PHILADELPHIA, Pa.—The oil tanker Atlantic States, newest and most modern addition to the tanker fleet owned by Atlantic Refining Co., was launched early today after a brief ceremony at the yard of the Sun Shipbuilding & Dry Dock Co., Chester, Pa. This is the eighth vessel to be launched in the current Atlantic building program, which began in November 1937.

The Atlantic States was sponsored by Mrs. William C. Shuman, wife of the chief engineer assigned to the new vessel. She was selected as sponsor when her husband's name was drawn by lot from those sea-going employes of the company who had 10 or more years' service.

Among the Drilling Contractors

Rogers Brothers Drilling Co. was drilling in shale at 2,540 ft. on its 1 Joe Benton, in the P. J. Benton Survey, Abstract 118, east of Nacona about 7 miles in Montague County, Texas. The firm was fishing for cones at 2,989 ft. in its A-1 W. B. Grimes estate in L. Ramey Survey 630.

Chet Roberts has the drilling contract on the Nat Appleman 1 Jazek, in C NE SE 7-16-10w, northwest of the Stoltenberg pool, in Ellsworth County, Kansas, which was just starting.

Falcon-Seaboard Drilling Co. was drilling below 3,818 ft. on its 1 Nutsch in NW SE 3-10-20w, Rooks County, Kansas. The test had conglomerate at 3,794 ft.

Jeff Spier, of Many, La., has the drilling contract for a wildcat test which has been staked by C. D. Neff, of Dallas, in De Soto Parish, North Louisiana, as his 1 W. M. Pollack, a Travis Peak test in C SE NE 8-13n-12w

Sam Jewell, of Ada, Okla., has the drilling contract on Allied Materials Co. 1 Hefner-Jones, in SW SW NE 21-3s-4w, between Asphaltum and the Healdton field, Jefferson County, Oklahoma. Contract is for 100 ft. in the Arbuckle or around 2,800 ft. The well was drilling below 1,300 ft.

Three-Way Drilling Co. was drilling below 3,100 ft. at its 1 Roelfs, in C NE NW 31-7s-17w, Rooks County, Kansas.

Kerr-McGee & Co. has drilling contract on Watchorn Oil & Gas Co. 1 Departmental, in SW NE 26-6n-12w, north of the Apache pool, in Caddo County, Oklahoma.

George H. Echols, Houston, Tex., contractor, has several operations for his own account under way. One string of tools is working on a wildcat, 1 Ballard estate, in Wayne County, Illinois, headed for the McClosky lime at 3,140 ft. He has taken over 1 St. Germaine from the W. R. Davis estate, in the Anse La Butte area, St. Martin Parish, Louisiana. This hole, now at 1,450 ft., is projected to go to 11,500 ft. Mr. Echols is building derrick for 1 Boories, also taken over from the Davis estate, in the same area. On the Hester dome, in the Convent area of St. James Parish, he has staked location for his 1 Realty Co., a farmout from Continental Oil Co. and Shell Oil Co., Inc. He is about to complete 1 Kessler & Sternfels, in the Napoleonville area of Assumption Parish, at 9,032-49 ft., drilled to a total depth of 10,474 ft.

W. W. Zimmerman, McAllen, Tex., has the contract to drill the Gulf Shore Oil Co. (Houston, Tex.) 1 M. M. Garcia, in Porcion 91, Starr County, Texas, 518 ft. east of the last of the D. G. Bintliff 1 M. M. Garcia, which was abandoned dry at 4,080 ft. last week. The new test, which has location cleared and will skid derrick as soon as weather permits, will go to 4,500 ft. Zimmerman has drilled all the tests in the Ulrich area.

Smith Brothers Drilling Co. has the contract for W. O. Allen et al 1 Jarvis, in NW NE NE 4-16n-2e, northeast of Merrick, in Lincoln County, Oklahoma. Surface pipe had been set and the test was ready to go ahead.

Keating Drilling Co. is the new firm name of the contracting concern formerly incorporated as the Robey-Keating Drilling Co., Tulsa. The change in names became effective January 1.

Orville H. Parker and **Don T. Ingling,** drilling contractors of Wichita, Kans., have a fourth interest in the drill site and are drilling a wildcat test in southern Rice County, Kansas, 3 miles north of the town of Sterling, and 4 miles west of the Wherry (conglomerate) pool. Leo R. Fortier, Dwight H. Wilson, Alpine Oil & Royalty Co. et al were drilling below surface casing at the 1 Blackall, in NE 5-21s-8w.

Oscar Reed, drilling contractor on the Marlow et al 1 Ralph, in C S½ NE NE 27-15n-2w, near Mount Auburn, in Christian County, Illinois, estimated the wildcat to be good for a potential of 700 bbl. per day. It topped the lime at 1,900 to 1,904 ft. and flowed after penetrating it 4 ft.

Rowan Drilling Co., Houston, Tex., has contracted to drill two wells for Shell Oil Co., Inc., both offsets to L. R. Benton and Delta Drilling Co. 1 J. B. Goldsmith, 3 miles northwest of Quitman, Wood County, Texas. Rowan was moving in derrick last week for the north offset, 1 J. R. Blaylock, in the S. G. Purse Survey, and setting surface pipe for the south offset, Shell 1 J. B. Goldsmith, in the W. W. Lanier Survey.

Sol Mealy, of Shawnee, Okla., has drilling contract for Lee Payne 1 Terney, in NE NE NW 30-12n-6e, west of Prague, Lincoln County, Oklahoma, which was drilling below 2,000 ft.

T. J. Conway, Kilgore, Tex., has been given the drilling contract on a test which has been staked by M. G. M. Oil Co. (Houston, Tex.) in the Lovelady area of Houston County, Texas, on a block of leases assembled by C. B. Culmore. The test is located on the 101.36-acre A. M. Jeter tract in the John Forbes League, 1 mile south of the Lovelady townsite.

Creekmore Drilling Co., Tulsa, has received contract to drill Stanolind Oil & Gas Co. and Amerada Petroleum Corp. 1 Jenne Ingram, 28-20n-4e, a wildcat in Payne County, Oklahoma, which is projected to 4,200 ft.

Houston Drilling Corp., Houston, Tex., is rigging up on a contract to drill 1 Bettis, in the Stewart field, Jackson County, Texas, for Salt Dome Oil Corp. The test is projected to 5,000 ft. The drilling firm recently finished B-1 Mauritz, in the West Mauritz field, Jackson County, for Gulfboard Oil Corp., a 140-bbl. producer at 5,582 ft.

Morris-Hamilton Drilling Co., Houston, Tex., last week spudded a well in the Ged field, Calcasieu Parish, Louisiana, for Union Oil Co. of California. It recently finished a producer for Union in the same area.

Dixie Drilling Co., Houston, Tex., is moving in material for a wildcat well to be drilled for General Crude Oil Co. in Beauregard Parish, Louisiana. This test, the 1 C. S. Baldwin, near De Quincy, is to go to 9,000 ft. Dixie has two strings of tools running on wells for Texas Co., in the Erath field, Vermilion Parish, and is starting work on another well for Atlantic Refining Co. in the Bayou Sale field, St. Mary Parish.

Falcon-Seaboard Drilling Co., Houston, Tex., is working on a wildcat, Gulf Refining Co. 1 Frank W. Miller et al, 3 miles south of the Homer field, in Claiborne Parish, Louisiana. As soon as that well is completed, the contractor will start drilling a wildcat for its own account, in con-

junction with Vincent & Welch, of Lake Charles, La., in the East Tepetate area of Acadia Parish. This latter test is to go to 9,000 ft. Falcon-Seaboard last week spudded a wildcat, 1 J. R. Daily, 1¼ miles southeast of Egan, in Acadia Parish, for Sun Oil Co. and Standard Oil Co. of Ohio.

Hollandsworth Drilling Co. has been awarded contract on a well to be drilled by W. F. Nenney, of Tyler, Tex., who was clearing location and moving in materials for his 1 R. C. Wise, on a 40-acre tract in the John Warren Survey. The location is an east offset to the Stanolind Oil & Gas Co. 1 Wise, in Woodbine sand pool of southeastern Hunt County, Texas. The test is being drilled on a farmout from Gulf Oil Corp.

Buffington & Smith Drilling Co. has the contract to drill a deep wildcat for R. L. Holcombe, of Jena, La. Operator has started at the 1 Louisiana Central, in SE 38-13n-3e, Caldwell Parish, Louisiana.

Bailey & Rutledge, of Dallas, Tex., has the contract on a test which was starting at the Crown Central Petroleum Co. 1 Startar, in SE SW 9-16n-6e, a 6,000-ft. wildcat in Richland Parsh, Louisiana.

Contractors Granted Hearing on Order 9240

DALLAS, Tex.—The American Association of Oilwell Drilling Contractors has been granted a hearing before representatives of the Department of Labor at Washington January 19 on the application of Executive Order 9240, the double-time wage regulation.

The association will contend that the order should be interpreted to not apply to employes of drilling contractors, if it should be so construed. The association will enter a formal request for specific exception of drilling-contractors employes. The association will be represented by its attorney and several contractors who are going to Washington prepared to support the plea for exception to the executive order.

"We suggest," says an association bulletin announcing the hearing, "that you may wish to communicate with your representatives in the House or Senate, advising of the pendency and time of the hearing on a matter in which you are, and they should be, interested, and inviting their attendance. It is our purpose to present in open hearing in as clear a way as possible the contractors' views on this problem, so that those charged with the making and interpretation of governmental policy may learn our reasons why Order 9240 should not be applied to such employes. If you receive notification of any person who intends to appear at the hearing, or if you intend to appear, please advise this office."

Farmers Urged to Grow Drilling Rope Substitute

Farmers in the midwestern states of Kentucky, Illinois, Indiana, Iowa, Minnesota, and Wisconsin will be encouraged to plant and grow Cannibas Satavia as a substitute for manila hemp from the Philippines and sisal hemp from Netherlands East Indies, both of which are used for cordage on drilling rigs. Approximately 300,000 acres are scheduled for planting with the harvest taking place in August and September of 1943. The fiber produced will not be as good as hemp and sisal but will make a satisfactory rope. The production of the plant is under the Commodity Credit Corp.

The common name for the weed i- marihuana, the notorious narcotic plant of the Southwest. The crop will be harvested just about the time it blooms so it won't have any effect as the narcotic is obtained from the flowers.

Southland High Bidder For Dunning Holdings

FORT WORTH, Tex. — Southland Royalty Co. of Fort Worth submitted a bid of $1,106,000 for the properties of the William H. Dunning, Jr., estate in the local probate court. Buffalo Oil Co., Dallas, Tex., made the original bid of $960,000 which was topped by Stanolind Oil & Gas Co.'s offer of $1,005,000 which later was raised to $1,055,000.

The properties include 25 producing wells on 1,404 acres in the Goldsmith pool of Ector County and a half interest in four wells on 80 acres in the same pool, a half interest in eight wells on 25.43 acres in the East Texas field, one well on 40 acres in the Keystone pool of Winkler County, an eighth override on 120 acres in the Keystone pool and scattered wildcat acreage in Gaines, Reagan, Sterling and Terry counties.

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PERSONALS

Ralph B. Lloyd, president of the Lloyd Corp., Los Angeles, independent producer, was reelected president of the California Oil and Gas Association for a second term, and **A. C. Mattei,** president of Honolulu Oil Corp.; **Reese H. Taylor,** president of Union Oil Co., were elected vice presidents. **C. A. Johnson,** president of Holly Development Co., was elected treasurer and **F. E. Foster** and **D. S. Kilgour** were elected managing director and assistant manager, respectively.

Wendell Thayer, who has been southern California editor of the Wall Street Journal for the past several years, has resigned to take an appointment as special assistant to the president of the Union Oil Co. of California, and in his new post will have charge of government-labor relations.

D. W. Benthall, instrument man in the electrical department of Texas Co.'s refinery in Port Arthur, Tex., turned in 5,000 old keys to help win the war. His specialty is recording instruments, and he accumulated the keys during years of service.

William L. Ainsworth, president and general manager of Ainsworth Brothers, is the first oil man ever to be elected as president of the Wichita, Kans., Chamber of Commerce. Mr. Ainsworth is also general manager of Mid-Plains Oil Corp.

Ernie Rogers, geological clerk in the Shawnee, Okla., office for Stanolind Oil & Gas Co., has been made scout for that district, succeeding **Mike Maravich,** who has been inducted into the Army. **Bob Mitchell,** Stanolind geologist, has been transferred from Wichita, Kans., to Shawnee.

John M. Martin, who started work with Socony-Vacuum Oil Co. as a junior clerk at Albany, N. Y., in 1904, became general manager of the company's eastern marketing division, embracing New England, New York, New Jersey, Pennsylvania, Delaware, Maryland and several southern states. He succeeds **Walter L. Faust,** who was recently elected a vice president of the company.

Capt. Wilson Chapman, former geologist for Shasta Oil Co. at Midland, Tex., returned to Midland last week from the Pacific war zone, decorated with the Purple Heart and the Silver Star. He has wounded while serving under General MacArthur.

H. H. Weinert, Seguin, Tex., was reappointed a member of the board of regents of the University of Texas by Gov. Coke Stevenson. Mr. Weinert has been active as an independent producer in Texas and Illinois.

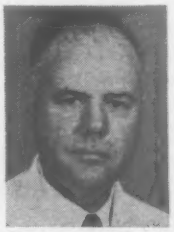
Cadet Harold A. Whitman, formerly in the engineering department of Texas Co.'s Louisiana-Arkansas division, was graduated from training school and is now flying in the Army Air Force.

T. J. Bird was recently made superintendent of the Michigan and Toledo division of the Sohio Pipe Line Co., replacing **H. A. Zey** who was transferred to Cincinnati, Ohio.

G. S. Taitt, formerly chief exploitation engineer for United British Oilfields, Trinidad, is now connected with the exploration department of Shell Oil Co., Inc., with headquarters at Houston, Tex.

W. M. McElroy, of General Petroleum Corp., Los Angeles, Calif., has been appointed manager of the refining department and comes to his new post after 25 years' service with the company.

Dana M. Secor, geologist formerly employed by Skelly Oil Co., is now attached to the geological department of the Atlantic Refining Co., Midland, Tex.



A. T. PROUDFIT

A. L. OWENS

Arthur T. Proudfit, new president of Standard Oil Co. of Venezuela and general manager of Lago Petroleum Corp., and Allen L. Owens, new division manager of Lago operations at Maracaibo, Venezuela. (Biographical sketches of these two promoted officials appeared on page 47 in the January 7 Journal.)

CLAUD B. HAMILL

Two Battleships May Result From This Oil Man's Work

CLAUD B. HAMILL, a Houston, Tex., oil man, was an important figure in the drive which recently amazed the country by setting out to raise $36,100,000 for a new cruiser Houston and winding up by handing over to Secretary of the Navy Frank Knox a certificate for $85,749,884.24.

Mr. Hamill, who is chairman of the Houston and Harris County War Savings Committee for the sale of bonds and stamps, is a member of the oil-producing firm of Hamill & Smith. This firm has interests in East Texas, Louisiana, Southwest Texas and the Conroe area of Montgomery County, Texas.

Announcement of the achievement was made to a nation-wide radio audience by Jesse H. Jones, secretary of commerce, at impressive ceremonies held in the Houston Coliseum. It was indicated that the fund surplus might be used to build a new aircraft carrier, the San Jacinto. The original cruiser Houston was lost in the Java Sea battle last March.

Mr. Hamill, born in Waco, Tex., in 1889, graduated from the Bay City High School and left Texas A. & M. College in his sophomore year in 1918 to enter the Navy for service in World War 1. Upon being mustered out he got a job as a roughneck in the Markham field, Matagorda County, Texas. A few months later he joined his father and brother in the Hamill Drilling Co. In 1931, following dissolution of that organization, he entered into a partnership with R. E. Smith, forming the firm of Hamill & Smith. The new partner-

ship started operations at Pierce Junction, Tex., and soon began to widen its operations.

Mr. Hamill and his partner, who is regional director for civilian defense, own an 800-acre ranch near Bammel, Harris County, Texas. It is stocked with cattle, which are a hobby of Mr. Hamill. "We play with it," laughed Mr. Hamill, referring to the ranch.

L. Clark Morgan, head of land and geological departments for National Refining Co., Wichita, Kans., was in West Texas last week preparing to open an office in Midland. The company has recently been checking properties in the Permian basin.

Charles I. Francis, of the Houston, Tex., law firm of Vinson, Elkins, Weems & Francis, has been appointed chairman of a Petroleum Industry War Council committee organized to handle the threatened lapsing of oil and gas leases because of inability of oil companies to comply with drilling regulations.

Ward M. West, geologist, has resigned from the Skelly Oil Co. at Midland, Tex., to accept a position with the Lario Oil & Gas Co. which has recently opened an office there.

Karl Mygdal, geologist with the Pure Oil Co., was elected president of the Fort Worth (Tex.) Geological Society at the January 4 meeting.

William B. Watson, petroleum engineer with Gulf Oil Corp., Fort Worth, Tex., has been commissioned a lieutenant in the Marine Corps and has reported for duty at the Quantico, Va., base where he is attached to the engineering office.

Jack Hearrell, Gladewater, Tex., will have charge of construction of a section of the extension of the War Emergency Pipelines' 24-in. eastward from Illinois. Mr. Hearrell was supervisor during the construction of the line from East Texas to a point 55 miles beyond Little Rock, Ark.

F. W. Bruner, superintendent in the St. Elmo, Ill., area for Carter Oil Co., has been transferred to Mattoon and given charge of all company operations in the Illinois basin district.

J. H. Grant, vice president of Houston Lighting & Power Co., Houston, Tex., has been named chairman of the utilities group by Lum Price, War Production Board collaborator and chairman of the Houston executive committee for industrial salvage. **Wallace Wilson,** president of Wilson Supply Co., has been appointed chairman of the drilling contractors and oil interests group, and **H. J. Pearce,** of Texas Iron Works, chairman of the oil-well supplies group.

J. H. Wolfe, purchasing agent of British-American Oil Producing Co., has been inducted into office as president of the Purchasing Agents Association of Tulsa. He succeeds **C. G. McLaren,** Shell Oil Co., Inc., who now assumes the position of national director for the current year.

Don A. Miller, assistant district superintendent in Oklahoma City, Okla., for Phillips Petroleum Co., has been transferred to Ponca City, Okla., to become district superintendent in the East Watchorn area, recently acquired by Phillips. **F. C. Jones** has been moved up to take Mr. Miller's place in Oklahoma City.

W. F. Sherman, district superintendent for Magnolia Petroleum Co. in the Yale, Okla., district, and **J. C. Dinger,** division superintendent of drilling tools in Oklahoma for Magnolia, retired from active service January 1. The men have served 26 and 24 years, respectively, for the company.

P. Hastings Keller, geologist of Detroit, Mich., will be in charge of the oil and gas section of the Indiana Geological Survey. Mr. Keller has been connected with the oil industry for nearly 20 years. **George E. Heap,** who had charge of the oil and gas activities at the survey, was called to the Army in December, and is now in the Air Corps.

Holland G. Campbell, who has been with the traffic department of Continental Oil Co., at Ponca City, Okla., for 12 years, has resigned to join Anderson-Prichard Oil Corp., in Oklahoma City, Okla.

Don Wines, former district geologist for Tide Water Associated Oil Co. and later chief geologist for Nate Appleman, at Wichita, Kans., has joined Midstates Oil Co., at Tulsa, as division geologist.

Hubert Vance Wilson, Jr., former scout at Shawnee, Okla., for Carter Oil Co. and later with the Carter land department at Wichita, Kans., has been commissioned an ensign in the Navy and has been ordered to training school.

H. N. Goodell, exploration engineer for Shell Oil Co., Inc., recently in Louisiana, has enlisted in the Marine Corps and is at officers' candidate school at Quantico, Va.

Hillard W. Carey, geologist for the Erle P. Halliburton interests, was elected secretary of the Houston (Tex.) Geological Society at a meeting last Thursday. He succeeds **W. L. Horner. L. P. Teas,** consulting geologist of Houston, spoke at the society's meeting, discussing "South American Observations."

Earl B. Gilmore, president of Gilmore Oil Co. of California, left recently for Fort Leavenworth, Kans., to join a group of civic, business and professional leaders of the nation who have been asked to attend a 28-day orientation course for civilian leaders under direction of the War Department.

Michael H. Donahue has been retired as wire chief in the Oil City, Pa., office of Northern Pipe Line Co. after 36 years of continuous service with the company. Coworkers presented him with a fitted traveling case.

John R. Suman, vice president of Humble Oil & Refining Co., Houston, Tex., has been named to the board of directors of the National Association of Manufacturers.

George C. Jehle, assistant sales manager of Globe Oil & Refining Co., Wichita, Kans., has been named to the Petroleum Industry Committee, in Chicago, where he will deal with supply and distribution matters for District 2.

Thomas Brightman, Jr., Crane, Tex., was injured last week in an accident on a contractor's rotary rig near Crane. He is the son of **T. C. Brightman,** Gulf Oil Corp.

Capt. A. W. Nichoson, assistant to the vice president of the Texas Co., has been holding a series of employe meetings in California outlining the oil industry's contribution to the war effort and the company's participation in it.

P. J. (Pat) Ryan, Ponca City, Okla., has accepted government service in the reclamation section, Marketing Division, Petroleum Administration for War, and has been granted a leave as manager of sales operations for Continental Oil Co. **O. C. Spore,** assistant manager, will assume Mr. Ryan's duties with Continental during his absence. Mr. Ryan has been associated with Continental for nearly 15 years, having joined the organization as vice president of the old Marland Oil Co. of Mexico, at Mexico City, in 1928.

Market Developments

East Coast

NEW YORK.—Stocks of gasoline and fuel oil on the East Coast continued to decline during the past week despite additional restrictions on consumption. The latter included the banning of all nonessential driving, further reductions in fuel-oil deliveries and the application of a priority system designed to insure supplies to essential consumers.

Enlistment of local police departments in the enforcement of the nonessential-driving ban and active operation of OPA investigators have given indications that the ban will be effective. In metropolitan New York alone, license numbers of 46,237 cars apparently violating the order were taken in the first 12 hours after the ban went into effect. Ration books were seized by OPA investigators in many scattered points throughout the East Coast area.

The further reduction in fuel-oil deliveries, amounting to 25 per cent of previous deliveries, had the effect of reducing consumption to approximately 45 per cent of last year's levels. The situation with respect to heavy fuel oil was especially critical and some institutions which use residual fuel oil for heating were able to remain open only by substituting lighter oils. The city schools in New York will be closed for the first week in February in order to save fuel oil.

Application of the priorities plan was hampered by the lack of specific definitions of the various classes of consumers and was the cause of considerable confusion. Complaints were voiced by consumers whose normal suppliers were out of fuel oil and other dealers refused to supply them.

Pacific Coast

LOS ANGELES, Calif.—Strong fuel-oil demand characterized an otherwise slow market in California as calls for gasoline have dwindled owing to low competitive prices and reduced retail sales. The authorization granted late in December to retail dealers to increase prices so as to enable them to operate at a minimum margin of 3 cents per gallon has not had much affect on sales as most stations in the competitive areas have been selling substantially below ceiling prices and could have, therefore, increased quotations without the order, if they wished. No stations dispensing major-company gasoline were affected as they already operate on a 3 and 4-cent differential with a few stations getting 5 cents per gallon for the so-called 100 per cent account.

Gas oil demand continues good but there is very little moving due to inadequate supplies.

The wave of gasoline buying which immediately preceded rationing in California was definitely reflected in the November sales which were only 1 per cent below November 1941. January sales, however, are expected to reveal more exact influence of rationing in California. There has been a temporary letup in the closing rate of service stations.

Mid-Continent

CALLS for gasoline and fuel oils among Mid-Continent refiners remained surprisingly active this week despite increasing difficulties in assuring deliveries. This condition applied particularly to gasoline which is under the dual depressing influences of inclement weather and direct consumer rationing.

Many Mid-Continent refiners are still purchasing available supplies in the open market in order to stretch their own production over as broad a range of customers as possible. Shipments from interior refineries to the East Coast are taking up much of the slack which otherwise would have resulted from rationing.

Residual fuel oils are sought in increasing volume by railroads and war plants which, judging from the nature of their inquiries, are still expanding power requirements. Forward buying, in an effort to avert severe shortages further down the line, is a more important factor in the current marketing operations than ever before. Each customer is attempting to avoid the necessity of accepting alternate fuels and to avert delayed production which would naturally follow.

Plans of the Office of Price Administration to adjust the product prices in order to stimulate output of residual fuel oil are being watched with particular attention by Mid-Continent refiners. Crudes available to interior refiners are generally more ameniable to production of high cuts of gasoline. Consequently, OPA's plans to reduce gasoline ceilings and lift fuel-oil prices has particular significance for inland-plant operators.

A.P.I. REFINERY REPORT

Week Ended January 2, 1943

(Figures in thousands of barrels.)

	Dly. crude runs to stills	Stocks — Gasoline	Residual	Gas oil
Appalachian	160	2,901	488	735
Ind., Ill., Ky.	736	15,825	2,369	5,549
Okla., Kan., Mo.	335	6,720	1,376	1,927
Censored area*	1,678	36,613	12,468	21,985
Rockies	97	1,584	597	365
California	728	18,777	55,583	12,352
Total 1- 2-43	3,734	82,420	72,881	42,913
Total 12-26-42	3,525	80,228	72,962	43,799
Total 1- 3-42	3,968	95,707	94,700	50,119

Note: Refinery runs and stocks for week ended January 9, 1943, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
January 2, 1943	233,938,000
December 26, 1942	233,227,000
January 3, 1942	244,440,000

*Excludes heavy, unrefinable stocks in California.

Gulf Coast

HOUSTON, Tex.—With one possible exception no lack of demand for oil products confronts refiners of the Gulf Coast territory. Their problem is how to get these products to the persons who want them. In the case of the lubricating oils there of course has been a pronounced slowing up in requirements for the automotive field. Refiners who are equipped to manufacture the higher-grade lubes have not been severely hurt by government restrictions on the use of automobiles. War needs are absorbing most of their output. Small refiners whose plants are able to make relatively low-grade lubricants only are said to be having some difficulty in disposing of their stocks.

Gasoline, which was displaying a few signs of softness a week ago, has been regaining its firmness. Refiners here and there who had undesirably large inventories seem to have disposed of their surpluses, and a moderately strong tone prevailed in that section of the market.

Kerosene and No. 2 fuel oil, for which buyers have been clamoring for months, exhibit no diminution of strength.

Transportation continued to be the central difficulty. If there has been any improvement in the facilities for moving material, refiners and marketers say they are unable to detect it. One marketer told of turning down an order for 100 cars of gasoline recently owing to his inability to get tank cars. Gasoline that was ordered last November for delivery in December is still going out in driblets, he declared.

Refinery Prices

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

(Prices as of January 12)

Refinery Gasoline

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Natural Gasoline

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	56 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	6.800	2.780	1.65
North Louisiana	.....	.....	.....	.....	.....	†0.80 0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16 50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-8½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36 50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.20
Boston, Mass.	14.90	4.50	9.80
Burlington, Vt.	16.90	5.50	10.10
Buffalo, N. Y.	16.20	5.50	10.60
Dover, Del.	16.70	5.50	12.00
Hartford, Conn.	15.60	4.50	9.70
Manchester, N. H.	17.30	5.50	10.80
Newark, N. J.	15.20	4.50	9.70
New York, N. Y.	16.10	5.50	9.80
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.90
Providence, R. I.	15.00	4.50	9.60
Washington, D. C.	15.20	4.50	11.00
Average 14 cities	16.02	5.14	10.49

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co., and Texas Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.50
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	‡9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	16.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.00
Average 11 cities	18.25	7.50	10.46

*Includes 1-cent state tax.
‡Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.57	5.96	10.76

Keep catheads smooth

Information supplied by "Oil and Gas Journal"

Grooved catheads are no friends to the efficient operation of drilling rigs. They cause unduly rapid wear of cat lines and spinning lines. They can easily cause line breakage. And they are dangerous.

Grooves cause unnecessary wear and heating of cat lines because the line load is concentrated at one point instead of being evenly distributed over a number of wraps. Due to the cyclical character of operation, the greatest load usually comes repeatedly at the same place on the line. The effect on line wear is obvious.

Fouling of the rope is always a possibility with grooves. If it occurs with a wear-weakened rope, a sudden break — with disastrous consequences — is very likely.

Building up grooved catheads is a rather simple job that can be done in any qualified oil field machine shop. Returned catheads should be inspected to see that the new surface is free from machining marks, or other surface defects that might accelerate rope wear.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE BRIQUETTES • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Clima[illegible]-ly-[illegible]m [illegible]mpany
500 F[illegible]v[illegible] . [illegible]ew York City

MOLY

Equipment Progress

Security Engineering Co., Inc., Receives "M" Award

The "M" burgee was awarded Security Engineering Co., Inc., of Whittier, Calif., recently in colorful ceremonies held at the plant. In addition to the Maritime "M," the Commission awarded the Victory Fleet Flag and Labor Merit Badges to employes of the firm. The honors were awarded for Security's record in converting from peacetime schedules. The ceremonies were attended by a number of military and government officials including Charles E. Walsh, Jr., chief of procurement section, production division, U. S. Maritime Commission, Washington, D. C.; H. C. Acker, U. S. Maritime Commission, Oakland, Calif.; Comdr. J. C. Arnold and Lt. Comdr. Clarence Froome of

Left: Charles E. Walsh, Jr., chief of Procurement Section, Production Division, U. S. Maritime Commission, Washington, D. C. Center: W. E. Sievers, executive vice president, and right, Otto Hammer, vice president and chief engineer of Security Engineering Co., Inc.

manufacture to war production, for the originality of production methods employed, for simplification of product design which further increased production, and for the high standards of quality maintained from the very first despite difficult production

the U. S. Navy; Maj. C. W. Clark of the U. S. Army; Comdr. C. W. Thomas and Lt. Max Sturges of the U. S. Coast Guard.

Charles E. Walsh, Jr., presented the Maritime "M" pennant and W. E. Sievers, executive vice president, accepted the award.

award has been granted to the men and women of the corporation for production excellence.

Fluor Corp. Opens New York Offices

In a move that provides direct company representation on the Atlantic seaboard, Flour Corp., Ltd., announces the opening of a direct company branch office in New York City at 1919 R.C.A. Building, 30 Rockefeller Plaza, with J. I. Lawrence, formerly of the company's Kansas City office, in charge.

The new office is staffed and equipped to handle all matters pertaining to the sale of Flour atmospheric aerator and mechanical-draft cooling towers, Fluor gas cleaners and Fluor mufflers and direct company-customer contact on matters pertaining to the design, engineering and construction of synthetic rubber, toluene, aviation gasoline, alkylation, isomerization, recycling, natural gasoline and gas-transmission plants and refineries in this area.

Hercules Awarded Army-Navy "E"

In a letter from the War Department dated December 19, 1942, and signed by Under Secretary of War Robert P. Patterson, Hercules Motor Corp., Canton, Ohio, was informed that the Army-Navy "E"

At impressive ceremonies held in the Spicer plant, Spicer Manufacturing Corp., Toledo, Ohio, recently was awarded the Army-Navy Production "E" Award. The ceremony was attended by many Army and Navy officials, purchasers of Spicer equipment, company officials, and over 5,000 factory employes

TRADE LITERATURE

NASSAU LABORATORIES, Hackensack, N. J.—Graphite Lubrication Handbook, which explains the work which graphite performs and lists the various products supplied. There is an indexed list of applications which the lubricating engineer will find helpful in keeping his machines at the peak of their performance.

GRAVER TANK & MFG. CO., INC., Chicago, Ill.—Bulletin Form 313, describing Garver water filters. This 12-page bulletin is fully illustrated, and contains a filter-plant questionnaire which when filled in enables the company to make the proper recommendations as to type and size of equipment necessary to meet individual requirements.

I. H. GRANCELL CO., 1601 East Nadeau Street, Los Angeles, Calif.—A bulletin on the use of joint sealing and antiseize compounds in refinery construction and maintenance. The bulletin contains detailed suggestions covering the construction and maintenance of pipe joints, studs, bolts, and flanges on refinery gasoline and oil lines, ammonia equipment, boilers, valves, pumps, heat exchangers, etc.

B. F. GOODRICH CO., Akron, Ohio.—Revised catalog section on the company's lines of steam hose, containing simple, easy-to-read rules for the care and maintenance of steam hose, as well as detailed instructions on the proper methods to attach couplings. Data on inside and outside diameters, weight and number of plies are listed also.

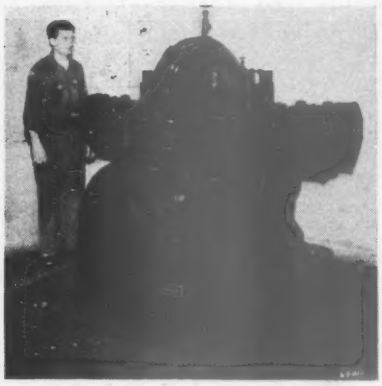
LINK-BELT CO., 307 North Michigan Avenue, Chicago.—Folder 1951, entitled "First Aid for Faithful Chain Drives." The booklet explains what to do to keep chain drives running, when replacements and repairs can't be obtained. It covers what to do for worn chain and for worn wheels, and shows how to get new life from old chain pins.

OAKITE PRODUCTS, INC., 57 Thames Street, New York.—A digest of 41 essential maintenance jobs generally performed in factories and mills and on which Oakite materials are being successfully used to speed up this essential work, conserve manpower, and get more service out of existing equipment and machines. The guide outlines in data-sheet form for convenient, quick reference: (1) Material used; (2) method followed; (3) time saved; (4) fire or other hazards eliminated, and (5) other advantages gained.

GRAVER TANK & MANUFACTURING CO., INC., East Chicago, Ind.—Bulletin Form

314, describing Graver hot-processes water softeners. This 22-page bulletin is copiously illustrated, with both photographic and chart material.

JOSEPH T. RYERSON & SON, INC., Chicago.—A handsome brochure commemorating the firm's one-hundredth birthday in wartime, entitled "100 Years of Peace and War." Ben Stahl, illustrator for Saturday Evening Post, handled the principal drawings which dramatize the events in the history of Ryerson and the nation. The pen-and-ink sketches were drawn by Joseph Feher. The text is handled in an easy, fast-moving style.



One of a large number of centrifugal pumps built and being built by the Cameron Division of Ingersoll-Rand Co. for the War Emergency Pipelines, Inc. Each pump will be electric-motor-driven at 1,780 r.p.m. and will operate against a total head of 707 ft. Three such pumps will operate in series so as to attain the high head of 770 lb. per sq. in. required by the operating conditions of the pipe line

Maritime "E" Award To Cooper-Bessemer

Cooper-Bessemer Corp., Grove City, Pa., has been awarded the Maritime "M," highest award of the U. S. Maritime Commission.

Rear Adm. Howard L. Vickery, vice chairman of the U. S. Maritime Commission and chairman of the board of awards, made the presentation of the "M" award.

Adm. H. L. Vickery presenting the Maritime "M" burgee to Gordon Lefebvre, vice president and general manager of Cooper-Bessemer Corp., during ceremonies at the company's Grove City, Pa., plant in recognition of production achievement at both C-B plants, Mount Vernon, Ohio, and Grove City

EMSCO DERRICK & EQUIPMENT CO., 6701 South Alameda Street, Los Angeles, Calif.—Bulletin 150-E, on Emsco steel derricks and substructures, to meet every oilfield requirement. This 16-page catalog is profusely illustrated with photographs.

Among Equipment Men

Thornhill-Craver Agent Major in Field Artillery

MAJOR WALKER

Prior to joining the services of the U. S. Army, Maj. Thomas W. Walker was Gulf Coast representative for Thornhill - Craver Co., of Houston, Tex. Major Walker is a graduate of Texas A. & M. College, and entered Army service in February 1941. He is serving with the Field Artillery.

Summers to Manage Export Sales

C. R. (Curt) Summers, who has been South American representative for Mission Manufacturing Co. for the past 9 years, has been transferred to New York City, where he will become manager of export sales. Gene Trammell, who formerly headed export sales for this company, recently entered the U. S. Army as a captain in the Ordnance Department.

Personnel Changes Are Announced by Kobe, Inc.

As a part of the company's current general war expansion, Kobe, Inc., has announced the appointment of R. G. Ralph as division manager of the company's Mid-Continent operations, and that of H. K. Ihrig as manager of the company's technical service department in the Mid-Continent area.

R. G. RALPH

H. K. IHRIG

A graduate of Phillips University, Mr. Ralph brings to his new position a wide experience in oil production technical and sales problems. His first association with the production business was with Phillips Petroleum Co. in 1929 and led to activities in the field of general production practices and later in specialized technical study involving the treating of crude oils for the entire southern division of that company.

Coming to Kobe in 1939 from his position as sales manager of Clymer Co., Mr. Ralph has been responsible for the entire Mid-Continent activities of Kobe as manager of the company's technical service department.

Mr. Ihrig attended Missouri School of Mines and the engineering school of Oklahoma A. & M. He went to work as a petroleum engineer for Wilcox Oil & Gas Co. and later with Phillips Petroleum Co. in Oklahoma City. Interest in petroleum engineering led to his association with the technical staff of one of the oil country's trade papers. In 1936 he became interested in the development of special equipment for the treatment of emulsified crude oils and studied problems involving nearly all of the Mid-Continent producing states.

Mr. Ralph and Mr. Ihrig's offices will be located at the company's division headquarters in Oklahoma City.

Hendy Purchases Pomona Pump Co.

Charles E. Moore, president of Joshua Hendy Iron Works, Sunnydale, Calif., has announced the purchase of the Pomona Pump Co., of Pomona, Calif., and its recently acquired subsidiary, the Westco Pump Division, St. Louis, Mo. Hendy also purchased the plant and equipment of Hydril Co., Torrance, Calif., to supplement the facilities available at Pomona.

The purchase of this prominent pump manufacturer gives the Joshua Hendy Co. an additional complete line in the machinery field. This further rounds out the scope created by the recent purchase of the Crocker-Wheeler Electric Manufacturing Co., builders of electric machinery at Ampere, N. J.

The Pomona division has been, and will continue to be, principally engaged in the manufacture of turbine pumps of the vertical type for all pumping applications. The Westco division specializes in smaller sizes for domestic and industrial pumping jobs.

Miller Promoted by Bethlehem Supply

T. R. MILLER

T. R. Miller, formerly special representative for Bethlehem Supply Co. in the Gulf Coast area, was recently promoted to resident manager for Bethlehem Supply Co. at Houston, Tex., and will be in charge of their sales office. He succeeds C. H. Seger, Jr., who has enlisted in the Navy.

Mr. Miller is a native Tulsan, having graduated from Tulsa Central High School in 1920. He received his first supply company experience when he joined one of Bethlehem Supply Co.'s predecessors in 1928. Since that time, he has served in various capacities throughout the Mid-Continent. His service has included sales and management in several boom fields.

In 1938 he was transferred to San Antonio, Tex., as a special representative and opened Bethlehem Supply Co.'s sales office at that point. He was transferred to Houston in 1939 as a special representative specializing in tubular sales in that area.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED, 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

All classified advertising payable in advance.

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

LEASES AND DRILLING BLOCKS

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton
St. Louis, Mo.

NEW MEXICO
State Oil and Gas Leases
Forty acres and multiples thereof, in a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

CRANE COUNTY, TEX., land nearby Gulf's drilling Sec. 2, B-28. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Texas.

ATTENTION OPERATORS: Lease blocks for sale in gas area provided operators will contract all gas production to present owner. Box B-420, The Oil and Gas Journal, Tulsa, Okla.

HAVE WELL with oil filling casing within few feet of top. Want production test made and more wells drilled. Shallow drilling, good acreage. Box B-442, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR LEASE, with one year drilling clause, 80 acre tract with option on two adjoining 80-acre tracts, located 2 miles north of west side of N.E. Edmond Field, Oklahoma, Harper Turner Oil Co., No. 1 Wilson. Write M. Wilson Dalphe, 529 Surf Street, Chicago, Illinois.

ROYALTIES

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

MONEY RAISING

PRIME LOANS TO
CORPORATIONS and INDIVIDUALS
Unsecured or Collateralized
LARGE Sums—LOW annual rates.
COLLATERAL DISCOUNT CORP.
Graybar Bldg.—New York City

HELP WANTED

A SPECIALIZED well cleaning and fishing organization expanding their services are in need of man for Oklahoma. This is an old, well-known going concern. Please do not answer unless you have oil field experience, sober and willing to work. Good salary and commission to right party. Must have car also be draft exempt. Write giving references and experience to Box B-444, The Oil and Gas Journal, Tulsa, Okla.

ESTABLISHED Midwest Company reclaiming industrial oils and solvents for War Plants needs man to assist General Manager. Experience and temperament should be such that after a period of training, could take full charge of branch plant. For dependable and capable person we offer attractive profit sharing opportunity. Reply in confidence with full particulars. Our employees know of this add. Box B-448, The Oil and Gas Journal, Tulsa, Okla.

SEISMOGRAPH
Large company wants men between the ages of 18 and 40 for non-technical and for technical positions on Seismograph Field Parties. Men without technical education or experience in this or similar work start at 140.00 per month. Others start at higher salaries. For interview write giving experience, education, and other pertinent facts. Those liable for early induction or who are employed in prime war industries need not apply.
Write Box B-400, The Oil and Gas Journal
Tulsa, Oklahoma

WANTED
Senior auditor, tax accountant, with New York Investment Firm. Knowledge petroleum industry desirable, not essential. Full information, salary expectation, draft status, confidential. Box B-443, The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

WANTED—Graduate mechanical engineer who has had at least several years' experience in maintaining Diesel engines, also heavy centrifugal pumps. Permanent position not in war production; attractive salary. Please reply in writing stating education, age, draft status, experience, salary expected and references. Box B-445, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEERS
Graduate Chemical Engineer or Chemist with several years experience in refinery or oil field on design and operation of light end equipment. Permanent position. Men employed in war industries will not be considered. Reply must state experience, education, age, draft status and salary expected. Box B-441, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

PETROLEUM Executive with record of accomplishment in administration of financial and managerial operations in South, Middle West, and East available for permanent connection any part of country. Rm. 1404-105 W. Madison, Chicago, Illinois.

COMMERCIAL project manager for refinery construction, purchasing agent, mechanical engineer and accountant. Many years experience as estimator and cost engineer. Box B-416, The Oil and Gas Journal, Tulsa, Okla.

REFINERY ENGINEER—Age 42, Classification 3A. Experienced, Design, Construction, Operation and Maintenance of modern equipment. Box B-430, The Oil and Gas Journal, Tulsa, Okla.

INDUSTRIAL CHEMIST, six years petroleum refining and production experience, desires responsible position with permanent and substantial company. Married, protestant, draft 3-A, good character, dependable, practical. Available on two weeks notice. Box B-419, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED PRODUCTION MAN
Wants interest in producing property; will look after all operations and reports. Age 41, have family. 22 years experience production, drilling, good education, references. Box B-392, The Oil and Gas Journal, Tulsa, Okla.

REFINERY FOUNDATION Design and Plans by Registered Civil Engineer. Contract or fee basis. P.O. Box 209, Pasadena, Cal.

EQUIPMENT WANTED

WANTED TO BUY Marine Diesel Engines. What do you have to offer?
Industrial Supply & Equip. Co., Inc.
338 Baronne St., New Orleans, La.
RAymond 0889

WANTED — Dynamometer. Suitable for use with Chevrolet Test Engine. Reply to Box B-446, The Oil and Gas Journal, Tulsa, Okla.

LARGE MINING company is desirous of purchasing one or two Askania Vertical magnetometers in good condition. Apply A. Brandt, 15 Grenadier Heights, Toronto, Canada.

WANTED: To buy one good used late model vertical (Askania) Magnetometer (temperature compensated system). State price. S. M. Goodner, Nashville, Illinois.

DIESEL ENGINES
Total 1600 HP. required, with or without Generators. Consider units 225 HP. and larger. Also smaller high speed units for standby service. Preference given units immediately available. Give complete details and price. Address Purchasing Department, Box B-423, The Oil and Gas Journal, Tulsa, Okla.

WANTED
Abandoned **Pipe Lines**, in or out of the ground, **Oil Wells, Steel Buildings** and Steel Storage **Tanks** of all sizes.
JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, St. Clair Co., Illinois.

(Continued on Next Page)

CLASSIFIED ADVERTISING — EQUIPMENT FOR SALE

OFFERING COMPLETE OPERATING REFINERY
LYNCH REFINING COMPANY—KILGORE, TEXAS

We are offering for immediate sale this complete combination topping and cracking unit, gasoline plant, carload Ethyl plant, boilers, storage facilities, thirty-mile pipe line gathering system, located in heart of East Texas Field. Must be handled quickly. Wire, phone or write for details.

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry — Robt. W. Duden

Union Ave. at 21st Street — Tulsa, Oklahoma

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25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.

Terms to suit.

CINCINNATI MACHINERY & SUPPLY CO.

26 West 2nd St., Cincinnati, Ohio.

FOR SALE—One partial list steam rotary equipment less boilers, rotary table, traveling block, swivel, located near Coyle, Oklahoma, priced right to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: Compressor Units near Crane, Texas. 2—90 H.P. Clark tandem 2-stage gas engine compressors and 3—Vertical 100 H.P. Model T-137 Clark gas engines, direct connected to Vertical 2-stage Clark compressors. Cities Service Oil Company (Pennsylvania), Houston, Texas.

FOR SALE—Approx. 6500 ft. 6⅝" OD 25.20# drill pipe with Reed Full Hole Shrink Grip Tool Joints, A-1 condition. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: Couplings: new, perfect, 2½", 3", 4", 5" and 8" Line and Merchant Cplgs. Also, large stock casg. cplgs. JULIUS M. FOGELMAN, Reading, Pa.

NEW power driven skid mounted piano wire winch, capacity 12,000 feet .072 line, 5 H.P. Briggs & Stratton Gasoline Engine (without measuring device). $332.00.—Box 5298, Dallas, Texas.

USED Admirality good condensor tubes. One 15 ton locomotive crane. 25—Standard gauge steel flat cars, 100,000# capacity each. Steel buildings—Water tanks on towers of all sizes. Write, wire or phone for INDUSTRIAL EQUIPMENT. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 338 Baronne Street, New Orleans, La.

ONE Steel Building 50 foot by 280 foot. One Steel Building 32 foot by 48 foot. Industrial Supply & Equipment Co., Inc. 338 Baronne Street, New Orleans, La. Raymond 0889.

Second hand Oklahoma City alloyed sucker rods, ⅞", ¾", and ⅝".

Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.

Structural Steel and Reinforcing Rods.

M. R. TRAVIS

1702 S. Boulder Tulsa, Oklahoma.

DIESEL—GAS—ENGINES

Large selection—All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY

48 Church Street, New York, N. Y.

FOR SALE—One complete steam rotary outfit less boilers, located near Coyle, Oklahoma, priced to sell. Inquire T. T. Eason and Company, Enid, Okla.

FOR SALE: 43 Joints 1290 feet New Youngstown 3½" OD 13.30# Grade D Smls Internal Upset Drill Pipe Range 2. Also 9 Joints 261 feet out of same string, slightly used, with Hinderliter FH 3 Way Pack-Off Tool Joints on each joint. 78 Joints 2340 feet 5⅛" OD 22.20# Youngstown Grade D Range 2 Internal Upset Seamless Drill Pipe with Reed FH Tool Joints on each joint. This string used but in first class used condition. Both strings situated on railroad siding at Wickett, Ward County, Texas. For prices write or wire A. R. Eppenauer, Pecos, Texas.

FOR SALE: One Wichita Falls Spudder, Model 61, capable of drilling 4000 ft. together with tractor and complete string of tools. Machine in first class condition and includes heavy shear poles. Priced at real bargain for quick sale. Write Post Office Box 867, Tulsa, Oklahoma.

FOR SALE—Two 15x10 Chicago Pneumatic Compressors less motors or power units. In excellent condition, suitable for low pressure service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE—A large stock of reconditioned valves and fittings suitable for refinery and pipe line service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE: No. 2 National Drilling Machine with gas engine, 6, 8 and 10" tools, good condition. F. G. Crary, R.R. #1, Lexington, Ky.

2—120 HP, 650 RPM, rebuilt Diesel engines, power units.

1—200 HP, 514 RPM, completely rebuilt Diesel engine, power unit.

The two above can be supplied with Generators if desired.

2—66 HP Boilers.

1—75 HP variable speed A.C. motor.

Also variable sizes small alternating current motors.

K. S. RICHARDS

P.O. Box 443, Fort Worth, Texas

Phone 3-5600

FOR SALE:

INDUSTRIAL PROPERTY

Located at

Houston, Texas

Consisting of approx. 23 acres of ground fronting paved highway and main railroad, with switch-track leading to MODERN ALL-STEEL BUILDING, approx. 60'x200' with 40' outdoor runway extension incl. two O.H. Elec. Traveling Cranes, 10 ton and 5 ton cap.

Priced reasonably!

IRON & STEEL PRODUCTS, INC.

13412 S. Brainard Ave., Chicago, Ill.

Phone—Bayport 3456

FOR SALE—One #6 Type D-1618 Marley Tapered Type Cooling Tower; capacity 600 GPM; priced right. Inquire Eason Oil Company, Enid, Okla.

5—7½"x20" Type VS, 500-lb. W. P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 246, Coyle, Okla.

COUPLINGS: For Sale—2000 pcs. 5½" OD, 500 pcs. 7" OD, 100 pcs. 6⅝" OD. All 8 Round Thread, API Casg. New, Perfect. Mill Tested. JULIUS M. FOGELMAN, Reading, Penna.

FOR SALE: Skid mounted tailing in drilling unit. Two Lufkin drums chain driven, over 6000 feet capacity. Spudding arms for cleaning out or drilling. Shelbro Petroleum Co., 334 Court Arcade, Tulsa, Okla.

FOR SALE—Bolted Tanks 5000 and 10,000 barrel capacity API construction, practically new. Feldman Petroleum Company, 544 W. Roosevelt Rd., Chicago.

COUPLINGS

2500—Brand new 13", OD casing couplings, 8-V thread, priced to sell. Louisiana Iron & Supply Company, Longview, Texas.

FOR SALE: O.C.S. Drilling Clutch, type F.C. V-Belt Drive, mounted on steel skids. Wire or write C. V. Phillips, 403 Crescent Blvd., Hutchinson, Kansas.

ONE RL Cardwell Double Drum Spudder. Mechanically A-1 shape. Complete with lines and tools. Address 2501 North Hudson, Oklahoma City, Oklahoma.

FOR SALE: Complete oil jobbing plant, 15 storage tanks about 11,500 gal. each, 4 horizontal. P.O. Box 284, Tulsa, Okla.

SPECIAL OFFER

IMMEDIATE SHIPMENT

OXYGEN-ACETYLENE WELDING HOSE SETS

Guaranteed—Heavy Duty

Standard Size—Double Braid

Samples furnished on request

Each set consists of OXYGEN hose (BLACK) and ACETYLENE hose (RED) with standard brass couplings attached to fit all makes of torches and gauges.

Length set	Price per set
12½ Ft. set	$ 3.10
25 Ft. set	5.80
50 Ft. set	10.60
75 Ft. set	15.60
100 Ft. set	20.60
Connector set	.50

Hose also furnished in continuous length reels of approximately 250 ft. and 500 ft. lengths.

OXYGEN HOSE	10c per ft.
ACETYLENE HOSE	10c per ft.
STANDARD COUPLINGS	15c each

Prices net—F.O.B. New York

CARLYLE RUBBER CO., Inc.

62 Park Place New York, N. Y.

1—4" Shell 4' x 40' Forged Steel Reaction Chamber

1—½" Shell 5' x 74'—4000 barrel cap.—Crude Oil Fractionator with Trays.

120—Pieces 3" I. D.—3½" O. D.—30' long—Chrome Tubes.

30—Pieces 3½" I. D.—4" O. D.—21' to 28' long—Chrome Tubes.

162—3½" O. D.—6½" Centers—Chrome Key Headers.

30—Pumps, various sizes and types.

A. C. BARTSCH

BOX 127, FOREST PARK, ILLINOIS

Classified Advertising

BUSINESS OPPORTUNITIES

AM INTERESTED in contacting a drilling contractor who is having difficulty getting business. Have good contacts and can raise money and am interested in a deal on a 50-50 basis. If you have a similar idea, contact me and we will make a mutually profitable agreement. Or, if you have different plan maybe we can work something out of it. Box B-417, The Oil and Gas Journal, Tulsa, Okla.

OPERATOR wants financial group to underwrite partial cost of drilling wells to offset production in Oklahoma. Box B-447, The Oil and Gas Journal, Tulsa, Okla.

FINANCING

INVESTORS YOU NEED? Organize Company. Contact Stockholders, Lease, Royalty Buyers. Cost Little. We furnish everything. Charter, Prospectus, Campaign, Leads. Faultless Organization, 3439 Michigan, Chicago.

WANTED: Private capital to lay pipe line and distribution for natural gas to four small cities. Gas already proven and available. Box B-383, The Oil and Gas Journal, Tulsa, Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

PATENT ATTORNEY

PATENTS—TRADE MARKS

All cases submitted given personal attention.

Form "Evidence of Conception with instructions for use and "Schedule of Government and Attorney's Fees"—FREE.

LANCASTER, ALLWINE & ROMMEL

Patent Law Offices

418 Bowen Bldg., Washington, D. C.

INCORPORATION

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

Lion-DPC Contract Calls For Outlay of $1,000,000

WASHINGTON, D. C.—Execution of a contract with Lion Oil Refining Co., El Dorado, Ark., to provide plant facilities in Arkansas at a cost in excess of $1,000,000 was announced last week by the Defense Plant Corp. Lion will operate the facilities and title will remain in DPC.

Phillips Donates $50,000 For Community Building

BORGER, Tex.—Phillips Petroleum Co. last week donated $50,000 to be used for erecting and equipping a new community building at Borger, Tex., according to an announcement of the Phillips Independent School District.

A telegram from Frank Phillips, Bartlesville, Okla., chairman of the board, and K. S. Adams, president of the company, notified the school board of the gift.

United Gas Training Women for Key Jobs

SHREVEPORT, La.—United Gas Co. has started a training course for women in order to maintain personnel at the levels necessary to carry on efficient operations. The company has dispaired of keeping men at various jobs in the system and has finally adopted the program of training young and middle aged women for the essential tasks.

A course of training has been established for women, including instructions in firing boilers, operating pumps, gaging wells and in making pipe-line connections.

West Central Texas

(Continued from Page 88)

of years ago but which has as many dry holes as it has oil wells. Roberts has moved one location north for his next well, which will be in SE NW Section 5, Block 5, H.&T.C. Ry. Co. Survey.

A wildcat location has been staked for a Swastika test in Jones County, 4 miles east of the South Noodle pool, by Merry Brothers & Perini at 1 Tom Largent, NW cor. Block 37, De Witt County School Land. Rig has been erected over the location.

In Coleman County, Ellis, Estes and Murray 1 W. C. Ray, near Rockcrusher, has been flowing by heads from sand topped at 3,140 ft. and promises to open a new producing area. On the strength of this showing J. O. Fox & Sons made location for a test ½ mile southeast, 330 ft. from the north and west lines of Mrs. M. Powell's 160-acre tract, Section 23, B.B.B.&C. Survey, Block 1. In the Santa Ana gas field, Lone Star Gas Co. 1 Duggins flowed 45,000,000 cu. ft. of gas from 2,134-96 ft. The well is located in the Mary Ann Fisk Survey, and ⅝ mile southwest, same company's 1 Georgia Jones is estimated at 7,000,000 cu. ft. of gas after acid treatment of 4,000 gal. at 2,130-2,206 ft.

Shackelford County received a new semiwildcat location by Roeser & Pendleton 3-A-139 Cook estate, SW NW SW Section 139, E.T.R.R. Co. Survey, midway between the Dawson-Conway pool and the northwest extension to the Cook pool.

Indications are that the area between the new Sealy pool in southwestern Callahan County and the Coker pool of northwestern Coleman County will get some drilling, as the area is being leased almost solid. Anderson-Prichard 2 Sealy Foundation, south offset to the discovery in Section 21, Block 2, G.H.&H. Survey, was drilling below 2,600 ft. headed for the Morris sand.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Coleman County: Cornelius Kroll 1 W. O. Starnes, SW NE Sec. 2, Blk. 1, G.H.&H. Sur., elev. 1,718 ft., pump 12 bbl., pay 2,000 ft., shot 2,000-08 ft., T.D. 2,020 ft., discovery.

T. S. Stanfield 1 J. Z. Verchers, cent. Blk. 4, Sec. 80, L. C. Mason Sur., dry, T.D. 805 ft.

Taylor County: Condor Pet. 1 J. T. Warren, 2,530 ft. from N and E, J. W. Page Sur. 123, dry, T.D. 2,720 ft.

Fields

Dawson & Conway, Shackelford County: Roeser & Pendleton 3-A-146 W. J. Cook estate, SW NW Sec. 146, E.T.R.R. Ry. Sur., dry, T.D. 1,623 ft.

Coker, Coleman County: Anderson-Prichard 2 Coker, Sec. 72, Blk. 2, G.H.&H. Sur., flow 136 bbl., natural, pay 3,043 ft., Morris sand, T.D. 3,047 ft.

Merkel, Taylor County: Fain-McGaha 2-B Ruel Perry, NE SW Sec. 4, Grimes County School Land, dry, T.D. 2,640 ft.

Scranton, Callahan County: Bennett & Little 1 J. H. Johnson, Sec. 21, Bayland Orphan Home Sur., dry, T.D. 325 ft.

Wimberly, Jones County: Merry Brothers & Perini & Watson W. Wise 1 W. H. Butler, SW NE Sec. 5, G. W. Winters Sur., dry, T.D. 2,275 ft.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	....
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

Journalisms:

ON page 34 in the Engineering and Operating Section begins the first of a new series of articles by the Journal's technical editor on practical refinery problems. This series is designed specifically to help the refinery engineer and superintendent meet the important problems which arise during the present period of rapid change and shortage of equipment with which to make the changes. It is important to know whether or not every unit in the refinery is working at greatest efficiency and the degree to which sacrifices in one department can be made to yield dividends on an over-all basis. These are matters which cannot be covered in books but the calculations required need not be complicated. The Journal's series on practical refining will deal with such topics as methods of increasing the capacity of fractionating towers, simple equations for solving problems on the efficiency of topping plants or gasoline-plant absorbers. Short-cut methods of quickly estimating the power requirements of pumps will be discussed. These will replace the laborious formulas suggested in handbooks. It is planned to carry one article on practical refinery operations every alternate week.

THE Journal's technical editor, W. L. Nelson, is eminently qualified to prepare such a series. As professor of refinery engineering at the University of Tulsa, he is abreast of all of the developments in refining. As a consultant he is thoroughly familiar with the workings of refineries and his articles are based on rigorously tested procedure which he has applied and which he knows will work. As the author of one of the best testbooks in the field of refinery engineering, many articles in the Journal and elsewhere, including his regular features, "Questions on Technology" and "Progress in Metals," Mr. Nelson has proved to be one of the most closely followed writers on the subject of refining in the industry.

WITH the industry and Washington becoming more conscious of secondary recovery as a means of maintaining production, it is fortunate that the Bradford field has furnished a laboratory for many years in which the most effective methods could be worked out. Despite the long record of success in that field, Harry M. Ryder, petroleum engineer of Bradford, Pa., feels that the Allegheny-Bradford district is on the threshhold of a period of even greater activity with correspondingly greater yields. His article on secondary recovery at Bradford, scheduled to lead the Engineering and Operating Section in next week's issue, discusses such important topics as the rapidity of water movement in the sand, selective shooting and causes of loss from improper handling of floods.

IN his rambles around the oil fields of Texas, Harry Simons of the Journal's staff found that water-disposal pits were being constructed by the use of Gunite more rapidly and more cheaply than by older methods of laying concrete. His article on the subject will appear next week.

NEIL WILLIAMS, also of the Journal's staff has spent quite a bit of time in the field in Kansas recently. Here he found a number of dually completed wells whose characteristics differed considerably from the multiple completions with which he had already become familiar on the Gulf Coast. The Kansas wells interested him and his article which is scheduled for an early issue will have the same effect on our readers.

IN designing centrifugal pumps for the three-stage installations at stations for moving 300,000 bbl. daily through the War Emergency Pipelines, Inc., 24-in. line, a number of important departures were made from customary practice. These will be discussed in the Journal soon.

CALENDAR

February

NATIONAL OIL SCOUTS AND LANDMEN'S ASSOCIATION, business session, Dallas, Tex., February 4, 1943.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.

April

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Texas Hotel, Fort Worth, Tex., April 7-9.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.

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